MARI PETROLEUM COMPANY LIMITED

Mari an Illustrated History

1957-2020

Major Aamir Cheema retired

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Mari Petroleum Company is having the second largest gas reserves in Pakistan, it has progressed over the years and now stands out among the top twenty five companies of Pakistan.

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Abbreviations

bbl	Barrel
bopd	Barrel of oil per day
BP	British Petroleum
bcfd	Billion cubic feet day
Btu	British thermal unit
Cft	Cubic Feet
CSR	Corporate Social Responsibility
D&PL	Developed and Production Lease
DST	Drill stem test
ESSO	Eastern States Standard Oil
HSE	Health Safety Environment
HRL	Habib Rahi Limestone
JV	Joint venture

MSD	Mari Services Department
MSU	Mari Seismic Unit
MDU	Mari Drilling Unit
MD	Managing Director
MMscf	million standard cubic feet
Mscf	thousand standard cubic feet
MGCL	Mari Gas Company Limited
MPCL	Mari Petroleum Company Limited
OGDCL	Oil and Gas Development Corporation Limited
PKL	Pir Koh Limestone
POL	Pakistan Oil Limited
PPEPCA	Pakistan Petroleum Exploration and Petroleum Companies Association
Rs	Rupees (Pakistan)
Retd	Retired
SML	Sui Main Limestone
SUL	Sui upper limestone
Stanvac	Standard Vaccum
TRCF	Total Recordable Case Frequency
Tcf	Trillion cubic feet
US$	United States Dollar
UTP	Union Texas Pakistan

Oil & Gas Terminology

Abandon. To cease work on a well which is non productive, a well is then plug off with cement.

Barrel – The basic unit for measuring oil. A barrel is equal to 42 U.S. gallons. Quantities of natural gas and natural gas liquids translated into barrels of oil based on equal energy content. The energy content of six thousand cubic feet of gas (6 MCF) is the rough equivalent of one barrel of oil. One barrel of oil = 35 Imperial gallons or 159 litres ; 7.5 barrels = 1 tonne or 6.29 barrels = 1 cubic metre. It may be noted that One Imperial gallon = 1.2 US gallon. A rule adopted in 1886 in West Virginia, which set the measure of a barrel as 40 liquid gallons plus 2 more gallons in favour of the buyer. **Barrels of Condensate Per Day** ("BCPD") - A common unit of measurement for the daily volume of condensate produced by a well. The volume of a barrel is equivalent to 42 U.S.gallons.

Bit. The tool used to crush or cut rock. Everything on a drilling rig directly or indirectly assists the bit in crushing or cutting the rock.

Block. Pakistan is divided into blocks in terms of exploration, these blocks are put up for auction for exploration; often named in terms of locality like Zarghun or Sajawal etc.

Blowout - An uncontrolled flow of reservoir fluids into the borehole, and sometimes catastrophically to the surface. A blowout may consist of saltwater, oil, natural gas or

a mixture of these. Blowouts occur in all types of exploration and production operations, not just during drilling operations.

Condensate. Hydrocarbons which are in the gaseous state under reservoir conditions and which become liquid when temperature or pressure is reduced. A mixture of pentanes and higher hydrocarbons.

Coring. Taking rock samples from a well by means of a special tool , a 'core barrel'.

Crude Oil – Liquid petroleum as it comes out of the ground. Crude oil varies radically in its properties, such as specific gravity and viscosity.

Creaming Theory. A statistical technique which recognises that in any exploration province after an initial period in which the largest fields are found, success rates and average field sizes decline as more exploration wells are drilled and knowledge of the area matures.

Drilling. Boring a hole in the earth for the extraction of oil and gas. A method of drilling where the drill bit is turned in a horizontal direction in an effort to produce hydrocarbons from a number of areas located at the same approximate depth. Bit is a drilling tool that cuts the hole. Bits are designed on two basic and different principles. The cable tool bit moves up and down to pulverize. The rotary bit revolves to grind

Downstream – Those activities in the oil and gas industry which take place away from the source of the supply. Downstream operations commonly include refining and marketing endeavours.

Exploration – The search for oil and gas. Exploration operations include aerial surveys, geophysical surveys, geological studies, core testing and the drilling of test (wildcat) wells.

Field. A geographical area under which an oil or gas reservoir lies.

Fault Trap . A structural trap in the earth, favourable for the retention of petroleum, formed by the cracking and breaking of a rock plane.

Fishing Tool . A general term for special mechanical devices used to aid the recovery of equipment lost downhole.

Flare . To burn unwanted natural gas through a pipe or stack.

Gas. Natural Gas is Hydrocarbons, which at atmospheric conditions of temperatures and pressure, are in a gaseous phase. Natural gas becomes a liquid at a temperature of minus 258 degrees F and may be stored and transported in the liquid state. Hydrocarbons found in natural gas which may be extracted or isolated as liquified petroleum gas and natural gasoline are known as Natural gas liquids. Natural gas contaminated with chemical impurities, notably hydrogen sulphide or other sulphur compounds, which cause a foul odour is classified as Sour Gas. Wet Gas is the one which contains liquid hydrocarbons in solution, which may be removed by a reduction of temperature and pressure or by a relatively simple extraction process; on the other hand Dry Gas is also a natural gas but it doesnot contain dissolved liquid hydrocarbons. Casing-head Gas is produced with oil in oil wells and is taken from the well through the casing-head at the top of the well.

Hydrocarbon. A compound containing only the elements hydrogen and carbon. May exist as a solid, a liquid or a gas. The term is mainly used in a catch-all sense for oil, gas and condensate.

Integrated Company – A company involved in virtually all aspects of the oil and gas industry including exploration, production, transportation, refining and marketing.

These companies are also referred to as major oil companies.

Joint - A length of pipe, usually referring to drillpipe, casing or tubing

Kelly . A long square or hexagonal steel bar with a hole drilled through the middle for a fluid path.

Kill .To stop a well from flowing (or having the ability to flow) into the hole or wellbore.

Line Heater . Equipment that transfers heat to the produced gas stream. Heaters are especially used when producing natural gas or condensate to avoid the formation of ice and gas hydrates.

Midstream. A term sometimes used to refer to those industry activities that fall between exploration and production (upstream) and refining and marketing (downstream). The term is most often applied to pipeline transportation of crude oil and natural gas.

Mousehole . A shallow borehole under the rig floor, usually lined with pipe, in which joints of drillpipe are temporarily placed.

Natural Gas . A naturally occurring mixture of hydrocarbon gases that is highly compressible and expandable. Methane is the chief constituent of most natural gas (constituting as much as 85% of some natural gases), with lesser amounts of ethane, propane, butane and pentane. Impurities can also be present in large proportions, including carbon dioxide, helium, nitrogen and hydrogen sulfide.

Non-operator. The working interest owner or owners other than the one designated as the operator of a well.

Oil Field. An area which is underlain by one or more reservoirs containing oil. An oil reservoir is a porous and permeable sedimentary rock containing commercial quantities of oil and gas. Three types of reservoirs are encountered including structural traps, stratigraphic traps and combination traps. Proven Reserves is the oil which is still in the ground, but which has been located and determined to be recoverable. The facility where the characteristics of petroleum or petroleum products are changed is known as refinery.

Petroleum. A generic name for hydrocarbons, including crude oil, natural gas liquids, natural gas and their products.

Pipelines. a tubular arrangement for the transmission of crude oil, refined products, and natural gas from the wellhead, refinery, and storage facility to the customer. Pipeline measures 14 to 42 inches in diameter, but is usually 20 to 36 inches. It is often composed of 40-foot lengths but lengths may be as long as 60 or 80 feet. The pipe is wrapped and coated for protection against corrosion, especially since it runs underground. About half of all gas and oil is moved by pipeline. Gas under sufficient pressure to enter the high-pressure gas lines of a purchaser; gas sufficiently dry so that liquid hydrocarbons - natural gasoline, butane, and other gas liquids usually present in natural gas - will not condense or drop out in the transmission lines.

Quad. A quadrillion of BTU's. This unit of measurement is used in connection with energy consumption. A barrel of crude oil contains 5.8 million BTU's. Natural gas contains about one million BTU's per MCF.

Rig. The structures and equipment used in drilling an oil and gas well including the derrick, engine, engine house and other equipment.

Spudding In. The first boring of the hole in the drilling of an oil well.

Stratigraphy . Branch of geology, deals with the scientific knowledge gain from the study of rock formation. The word stratigraphy comes from the Latin *stratum* and the Greek *graphia*, which means the descriptive science of layered rocks

.**Sedimentary Basin** is defined as Geologically depressed area with thick sediments in the interior and thinner sediments at edges

Upstream. Activities in the oil and gas industry which take place close to the supply. This normally includes exploration and production activities.

Well. A hole drilled in the earth for the purpose of finding or producing crude oil or natural gas or providing services related to the production of crude oil or natural gas. **Injection well** – A well employed for the introduction into an underground stratum of water or gas under pressure. Injection wells are employed for the disposal of produced water from oil and gas wells. **Dry Hole** – A completed well which is not productive of oil and/or gas or which is not productive of oil or gas in paying quantities. When an oil well is close down temporarily for repairs, cleaning out, building up reservoir pressure, lack of market, etc. is known as Shut Down. However to cease work on a well which is non-productive, to plug off the well with cement plugs and salvage all recoverable equipment is called Abandon. An appraisal is a well drilled as part of an appraisal drilling programme which is carried out to determine the physical extent, reserves and likely production rate of a field. **Wildcat Well** is an exploratory well being drilled in unproven territory, that is, in a horizon from which there is no production in the general area. **Wellhead.** The equipment at the surface of a well used to control the pressure; the point at which the hydrocarbons and water exit the ground.

Petroleum; A Tale of Dead & Living

There are two kinds of civilisation present in our time one which is living , recorded, empirical, visible, dependent on water and it dates back to mere ten thousand years. The other now dead is underneath us, also comprising of water and it dates back to millions of years without any history. Our living civilisation progress is almost dependent upon the dead hydrocarbons as they are providing much needed fuel for our survival. Pakistan is a unique country in a sense that here both civilisation, living and dead are present. Mohenjo Dharo and Harappa are among the oldest civilisations in the world that took birth along River Indus and its tributaries almost 5000 years ago and their ruins are still present. In Pakistan some of the world's largest reservoir of hydrocarbons have been discovered in last century and the exploration is still underway. There is a definite connection between both and this makes study of living history and exploration of dead underneath us an interesting phenomenon.

Ancient civilisations were in knowledge about the subsurface minerals, including petroleum;[1] a name derived from Latin 'Petra ' and Greek 'leum' thus a liquid or oil from a rock ': however the word came into use in 15th Century A.D. through a

1 Brittanica Concise Encyclopaedia ,2006,s.v.''petroleum'' https://www.nationalgeographic.org/encyclopedia/petroleum/

German mineralogist George Bauer.[2] The later day archaeological discoveries reveals civilisations on the banks of great rivers Euphrates, Tigris, Nile, and Indus; 7000 B.C. were using this rock oil for construction of bridges as by Sumerians, mummification by Egyptians and for water proofing of structures by Aryans in Harappa and Mohen jo Dharo. It is strange coincidence that some of the world's largest petroleum reservoirs have been discovered on the sites of these very ancient civilisations like oil reservoirs in Iraq, Iran, and natural gas reservoirs in Pakistan .[3]

In medieval era it was believed that earth was created on 26th October 4004 B.C.[4]. Available scientific evidence highlights that the date of our planet is much older than what a normal human mind can comprehend or calculate, it dates back to almost four billion years in terms of geologic time[5] with different ages and era's running back to almost 200 million years. The origin of our earth is still debateable; there are various theories; religious, philosophical, biological and geological. Earth is as old as one can imagine. [6]

Petroleum is a naturally occurring liquid found in rock formations. It consists of a complex mixture of hydrocarbons of various molecular weights, plus other organic compounds. [7]It is generally accepted that oil is formed mostly from the carbon rich remains of ancient plankton after exposure to heat and pressure in the earth's crust

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2 http://farlang.com/books/agricola-bandy-de-natura-fossilium George Bauer *De Natura Fossillium*, 1546. Also see Pliny's *Natural History*, 76 A.D. Aristotle *Meteorologica*,300B.C.

3 Rhoada Murphy *A History of Asia 7th edition* (Routledge,2014),pp,2-22.

4 https://www.washingtonpost.com/news/speaking-of-science/wp/2017/03/06/dear-science-how-do-we-know-how-old-the-earth-is/.

5 "Geologic time." *Encyclopedia Britannica. Encyclopedia Britannica Online Academic Edition*. Encyclopedia Britannica Inc., 2012. Web. 20 Feb. 2012. <http://www.britannica.com/EBchecked/topic/229694/geologic-time

6 Dr Lawrence Badash professor of History of Science at University of California, 'The Age of Earth', *Scientific American, August 1964.*

7 /https://www.britannica.com/topic/list-of-petroleum-products-2069393.

over hundreds of millions of years. Over time, the decayed residue was covered by layers of mud and silt, sinking further down into the Earth's crust and preserved there between hot and pressured layers, gradually transforming into oil reservoirs.[8] In 100B.C, a Roman scholar Marcus Terentius highlighted the disinfectant qualities of petroleum vapour thus Romans were the very first to use petroleum for fumigation. By 10th Century A.D, Arabs were distilling oil, both Cairo and city of Jericho were lit with it. Marco Polo in his travelogue highlights that in Baku 'everybody uses oil lamp'.[9] Russian brothers Dubinin had purified kerosene directly from petroleum and the process of refining kerosene from coal was later discovered by Gesner in 1846. Later Ignacyu Kasiewicz improved upon Gesner's method to develop a mean of refining kerosene from the more readily available Rock-Oil or petroleum seepages in 1852. Consequently, the world's very first oil refinery was built in Bodrka near Krosno in 1853. On the American continent, Benjamin Sillimen a Yale professor through experiments was able to fractionate petroleum by distillation. At Baku, about whom Marco Polo wrote in his travelogue that every house is lit with oil was the site of very first modern oil refinery in 1861; it was producing almost 90% of world's oil . Commercially pioneer oil well was drilled in Poland in 1853 followed by another in Romania in 1857. Later at Jaslo (Poland) and at Ploiestic (Romania) prominent oil refineries were built.

Modern petroleum exploration and industry took birth with the Captain Drake's oil drilling on 28th August 1859 at Pennsylvania; it is worth mentioning that Captain Drake had received a letter a day earlier from his investors to terminate the much

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8 Stephen Howrath *A Century in oil The Shell transport and Trading Company 1897-1997* Weidenfeld & Nicholson,London,1997,pp-17-22.

9 Ismail Nawab, Peter Speers, Paul Hove *Saudi Aramco and its world. Arabia and the Middle East* (Dahran,ARAMCO,1995),176.

awaited, funded and almost futile project. This by itself set the pattern of even present-day oil industry. Exploration is the key word in this industry, to explore the earth in search of petroleum, at times it is successful and at others it is a dead end. Before this day of August, the oil was gathered by digging pits or skimming natural seeping from the surface of streams. Captain Drake had drilled to a depth of almost seventy feet. America being the pioneer in petroleum industry set the benchmark, they introduced the word barrel which is the standard unit for measuring oil, it equals to 42 US gallons. In 1865, the world oil production was 7000 barrels, and 6800 barrels were being drilled in USA. By 1895, this production increased to 2,84,000 barrels daily and by end 1945 it was over seven million barrels daily which increased to over sixty million barrels daily in 1990.[10]

In the last century, oil exploration was limited to the areas known to have oil seepage , later a genetic relationship was established between oil traps and structure., known as anticlines. When this method fails then oil is explored subsurface or stratigraphic traps.[11] At present world's major oil supply comes from structural traps.

In the Subcontinent, a Geological survey department was established in 1851 with the sole aim to discover coal[12] and the very first publication came out in 1879-87 known as Manual of Geology in India. [13]The very first oil discovery was rather accidental, the work on Assam railways in 1887 resulted in the discovery of oil near Digboi, it was simply gushing out of the earth in malaria infested jungle. It is worth highlighting that the very first oil exploration in India started in 1866 almost thirty miles east of Digboi. The first well at Dibrugarh was 178 feet deep and reached a total

10 Stephen Howrath *A Century in oil*,pp-17-22.

11 B.R. Hussain *Paleography, a tool for oil exploration in Pakistan*

12 https://www.gsi.gov.in/webcenter/portal/OCBIS?

13 A.H.Kazmi, M.Q.Usman *Geology and Tectonics of Pakistan*. Karachi; Graphic, 1997,pp,10-30.

depth of 662 feet; later Assam Oil Company was formed in 1899 and was producing 7000 barrels of oil daily at its peak output. In the present-day Pakistan, before it gained independent in 1947, the very first exploration of oil was undertaken by Punjab Government in 1886- 87;[14] In 1866, some seven or eight holes were dug in and around the seepages near Fatehjang, 25 miles west of Islamabad, and in Kundal (Kishor Range) yielding a few gallons of oil per day. Then, in 1870, B. S. Lyitaan, an American from Pennsylvania was hired to investigate the oil prospects of the Punjab. His report is of special interest, since its maps were probably the first ever published on which subsurface structure was delineated by contours. [15]In 1885, in Balochistan, thirteen oil wells were drilled on the oil seepages at Khattan , it was quite a success as almost 20,000 barrels of oil were produced till 1892 when wells became dry. The impetus for this drilling was to establish a convenient source of fuel for the railway system which the then Indian Government was constructing to help secure the Afghanistan - Indian border (Durand Line).

Immediately prior to World War I, various investment syndicates (mainly British financed) were formed to explore in the Punjab ,the first significant company; The Attock Oil Company was established at London on 1st December 1913. Attock Oil Company in collaboration with Burma Oil Company (BOC) in 1915 drilled at Khaur in District Attock; oil was discovered in Miocene and Ecocene reservoirs, it produced oil in excess of four million barrels till 1990. Burma oil Company (BOC) was also engaged in exploration, it carried out surveys including gravity survey of Potohar; they drilled an exploratory well' Chandragupt-1' at Makran Coast ; to a total

14 http://www.ppepdr.net/IOP-Brochure.pdf Ministry of Petroleum Pakistan

15 Ministry of Petroleum and Natural Resources, Government of Pakistan , *Investment opportunities in Pakistan's upstream oil and gas sector,* 2009.

depth of 810 meters in 1916. Later both AOC and BOC made a combined exploration efforts and consequently Dhullian in 1936, Joya Mir in 1944 and Balkasar in 1946 were the major oil fields discovered in United India and they all became part of Pakistan.

Momal ji Mari

The word Mari is a Sindhi and an old Sanskrit, etymologically meaning; birthplace, importantly a place where oil can be found; a trading place of oil. The folklore[16] highlights that almost a millennium ago, there lived a rajah in the present day Daharki area, and he had seven daughters among whom Momal was the most beautiful. The mud palace itself was a remarkable feat of architecture, designed by the daughters themselves, in a. manner that only they knew the correct path to the chambers. When the time for their marriages came, Momal put forward the condition that, only that man can be her husband who can answer all her questions and able to reach the courtyard. Many a prince came and lost everything in a quest to marry the most beautiful princess of her time.

A day came when, four noble persons from the desert lost their way while hunting and found themselves in a conversation with one such prince who had lost everything in a bid to win over Momal. One of the noble Rano was finally able to win over the Momal, but in the process he had offended his other colleague including the raja to which he was a minister. The power of love was such that Momal and Rano could not live without each other, every night Rano would burn the oil so her lover could keep his direction.

I trimmed the wick again and again

Oil is consumed at last

16 Shah Abdul Latif Bhittai died 1761 A.D., a renowned Sindhi man of letters wrote some fabulous love stories, about seven women in the medieval era..

Stranger-beloved, do return

Riding a camel fast,

Weeping for Rano, night is past

The whole night I wept

Rano was put under the duress of his friendship with the raja, the raja being jealous ordered Rano not to meet Momal again but love is such a feeling that such restrictions have seldom stopped lovers from fulfilling their soul mating. Rano would travel in disguise on camel, every night travelling long distance and still being able to be at raja's palace in the morning. This secret did not last long and raja imprisoned Rano. On the other hand, Momal unaware kept on burning oil every night so Rano could home in. One such night, Momal's sister Somal slept with her to console her sister, as fate would have it, Rano was able to make his way to Momal's chamber on that very night and on seeing someone sleeping with Momal left dejected.

Momal in the morning saw the footprints and the cane of Rano and instantly realized what tragedy fate has played with her. She soon left her palace in disguise and reached her lover's kingdom where she yearned just for his sight. One day she was able to meet him and narrated him the truth which Rano did not believed and as such in order to prove to him her true love, Momal left the palace and later jumped into a burning oil well. Rano on the other hand as soon as he learnt about this realized how wrong he was, so he also ran after his love and in a bid to save her also died in the burning oil well fire.

Momal Ji Mari is now a ruin, and is ranked among the archaeological heritage of not only Sindh but also of Pakistan. The folklore is also among the five classic love

stories of Pakistan.

From the perception of oil and gas, the fact that oil was being traded in the area almost half a millennium ago rouses excitement. The folklore played an important role in the initial exploration of oil and gas in the area by the ESSO. When gas was finally discovered, the field was named after the Mari; an ancient name for 'place where there is oil'.

Apart from the Momal, there were eight more Maris (oil bearing areas) as mentioned in ancient folklores, thus oil was the trade and power in Vedas era. It is testimony that the very first oil fields in the subcontinent were discovered among these Marris including, Marri Indus at Attock. The very first natural gas reserves in subcontinent were also discovered not far from Marri tribe in Baluchistan. The present Mari Gas Field falls in Jaisalmer High, ' *the Jaisalmer basin extends 30,000 square kilometres in South west Rajasthan, it extends to Mari region of Pakistan and forms part of Indus Basin*'.[17] Therefore apart from historical folklore , the geographical data validates the presence of hydrocarbon in the area encompassing the story.

17 Alok Shukla *Jaisalmer Basin, an integrated study.* Department of Applied Sociology, Indian School of Mines, Dhanbad.

Chapter II

Stanvac & Mari Gas Field 1957-1984

At the time of independence in 1947, there were four oil wells in Pakistan namely Khaur, Dhullian, Joya Mair and Balkasar.[18] All of these wells were in Punjab and owned by Attock Oil Company (AOC) producing 1500 barrels per day, the remaining oil requirement of the country which totalled 7500 barrels was imported.[19] Oil exploration was given a priority by the new government, thus an act was passed in January 1949 which regulated the oil exploration in the country. The act specified that contracts with oil companies will be on production sharing. It was enacted that any foreign company carrying out exploration in the country will employ at least one quarter of work force from local the population. Minimum of 250 and maximum of 5000 square miles of area will be allotted for a period of three years for exploration.[20] In 1949, Pakistan Oil Limited (POL) was formed; it was a subsidiary of Attock Oil Company with government having 33% shares. In 1950, another company Pakistan Petroleum Limited (PPL) was formed, it had its roots in Burmah Oil Company(BOC).[21] The very first oil well after independence was drilled at Lakhra near Karachi on 2nd May 1948 by BOC , it was drilled to a depth 12,666 feet in Sembar formation; it was later abandoned .

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18 Ministry of Energy (Petroleum Division) Hydrocarbon Development Institute of Pakistan. *Pakistan Energy Yearbook-2016.*

19 *Pakistan Petroleum Policy 1991* . Government of Pakistan, Ministry of Petroleum and Natural Resources, November 1991.

20 Government of Pakistan Act No.XXIV of 1948 ,dated 8th January 1949, titled *The Regulation of Mines and Oilfields and Mineral Development (Government Control) Act,1948*.

21 *Pakistan Petroleum policy 1991* .

Pakistan Oil Limited on 10th October1951,[22] made a spectacular discovery of large reserves of natural gas in the Sui Main Limestone of Early Eocene age in Bugti tribal area, on the Sui structure (located in Baluchistan Province), in Central Indus Basin. The original recoverable gas reserves were estimated to be over 10 trillion cubic feet (TCF) equivalent to about 1 billion barrels of oil, the heating value of the gas is 955 Btu. The discovery of Sui Gas Field was the first major milestone in the search for hydrocarbons in Pakistan. It brought an economic and social revolution; within a year gas pipes were laid till Karachi and domestic life style changed. Cooking became safe and easy, reliance upon oil for domestic use was reduced considerably. Sui Gas Transmission Company (SGTC) was established in 1954, the very first gas company of Pakistan, a sister company Sui Northern Gas Company Limited (SNGPL) was raised in 1962.[23]

In the wake of the natural gas discovery at Sui in 1951 , international oil companies joined the modern day gold rush. Karachi became the hub of economic and social activities. In 1954, Standard Vacuum Oil Company (Stanvac) was the first oil company which came to Pakistan in search of oil and gas; followed by Hunt International in 1955, Shell Oil in 1956, Sun Oil in 1957 and Tidewater in 1958; all were American oil companies in search of oil. Between 1954-1959 no less than 34 exploratory oil wells were drilled and natural gas was discovered at Zin, Uch, Mazarani, Khairpur and Kandkot by (PPL) and Stanvac at Mari; all in Eocene limestone reservoir. Only notable oil discovery was at Karsal in Potohar region by PPL and POL but quantity was less.[24]

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22 *Pakistan Energy Yearbook,2016*.,p-93.

23 *Petroleum Policy 1991*, Government of Pakistan.

24 Iqbal Kadri *Petroleum Geology of Pakistan,* Pakistan Petroleum Limited , Karachi, 1995, pp,3-14.

Pak-Stanvac Petroleum Project (PSPP).1954

On 24th September 1954, a memorandum of understanding was signed between Pakistan and Standard Vaccum Oil Company; resultantly Pak-Stanvac Petroleum Project[25] took birth. Stanvac was one of the several dozen oil companies which took birth in America after the giant oil company Standard Oil Company which owned almost 90 % of oil business in USA was dissolved through a court decision. Stanvac a reputed company was operating in the region since 1913 in Bengal exploring oil. Under the agreement, Pakistan Government held 25% shares, Mobil having 37.5% and remaining shares by Esso Eastern. The concession area comprised of 10,000 square miles in West Pakistan and 15,000 square miles in East Pakistan

Pakistan had inherited only a skeleton of geographical survey on independence as majority of equipment was at Calcutta. However, the government patronised it and departments were opened in universities at Karachi, Lahore and Peshawar. An extensive seismic survey of the country including aerial survey was carried out by the Geological Survey of Pakistan with the assistance of Canada and USA . Stanvac during its exploration in 1955 conducted Aeromagnetic Survey of more than 1,000,000 square miles and Gravity Surveys covered 10,000 square miles alongwith 4000 square miles of seismic survey; surface geological investigation was completed by December 1956.[26] PPL was the pioneer that carried out survey after independence in 1949 and also between 1956-60, followed by Hunt between 1957-59 and Tidewater in 1959-60.[27] However it was the historic folk tale which acted as the beacon and

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25 Gazette of Pakistan, 30 December 1976.

26 A.Munir,S.Asim,S.A.Bablani,A.A.Asif Seismic Data interpretation and Fault Mapping in Badin Area, Sindh,Pakistan. *Sindh University Research Journal*, Vol.46 (2)2014. .pp,133-142. *Mari News* vol-5,issue No.4.

27 A.Munir,et al "Seismic Data Interpretation and fault Mapping in Badin Area, Sindh". *Sindh University*

exploration was finally focussed in and around Daharki; almost an eagle's flight east of Sui gas field.

Daharki is a frontier town situated between Sindh and Punjab, in 1955-56, when the initial exploration was initiated by the Stanvac Company, there was no air link between the Karachi and the Daharki, the only way other than the sixteen hours drive was an equally laborious rail journey.

During that time, there was no electricity, medical facilities, educational institutions and locals had no access to fresh drinking water. Radio was the main source of news for the locals and foreigners as there was no television, it came in Pakistan in 1964. Initial exploration was conducted in the summer heat of Sindh with temperatures soaring to as high 50 degrees centigrade, Mr George and Mr Roberts were the two pivotal figures who spearheaded the initial exploration in Sindh.

Exploration then and today is still based upon same principle of assumption, although in our era the technology has greatly advanced the chances of success yet it is not guaranteed. Mr Roberts was a man in his mid-forties with a fat belly; he had a good sense of humour which is a prerequisite for a successful explorer. The day at camp started early in the morning, after initial marking of the intended drilling site, the machinery was brought by road from Karachi. The process of drilling is laborious and requires an immense patience. It took almost a month of drilling and it was decided that efforts will be continued for another two days and if no result is found than it will be abandoned; a usual practice in oil exploration. Camp was established under the canvas, and after a long day, during and after dinner the men would sit

around and shares their tales of life. Language was a barrier but soon locals and foreigners both picked and devised easy signals and vocals. As Juma a local recalls,

'The presence of white skinned men was a novelty in the tribe, we were living in bhashas, and reed built huts. There were few animals in our clan as well; usually we migrate with the water and weather. Life was tough only I did not knew at that time. I do remember when the gas was discovered, it was evening and our clan elders were sitting together smoking tobacco and we children were sitting at close by when, they narrated how white men who have been digging for the gold of Momal, have found the gas, a gas which can kill anyone who tries to venture near the treasures of Momal'

Mari X-1 was the very first well drilled, at 1535 hours on 7th July 1957. It took another year of drilling before this well became operational and with this the area, company and the country was ushered into a new era. Two more wells Mari X-2 which was dry hole and a flank well and Mari X-3 were drilled. Estimated gas reserves were in range of 4 Trillion Cubic Feet (TCF). Wells were drilled to a depth of 2053 meters in sub section of the lower Kirthar 'B' limestone formation. Pak – Stanvac apart from finding gas in Daharki , also drilled in East Pakistan , 'while drilling for oil at Kuchma in Bogra District, the project struck a thick seam of coal at a depth of 8,000 feet'.[28]All in all, the Pak-Stanvac drilled eight exploratory wells in West Pakistan and three in East Pakistan, a total depth of 1,25,966 feet was drilled.[29]

South Eastern Drilling Company was engaged by Esso for drilling. Muhammad Sadiq born in Poonch (Azad Kashmir) came to Sindh in 1956 and soon found a job

28 Mari News Volume No.5, October-December 1996.

29 Information brochure published by ESSO in 1970.

with the drilling company as driver. He was later employed by Esso as permanent staff. It is worth highlighting that he remained on active service till 1993. Another notable person to join Stanvac in 1962 was Muhammad Sadiq, a resident of Rawalakot (Kashmir) who came to Karachi in 1953 and served as domestic help before joining Stanvac in 1962 as a driver. '*I was initially assigned the duty to drive Mr Macpherson the managing director, we had a Mercedes Benz then, I fell in love with the car and took extra care of it, resultantly after two years I was made general manager of drivers. There were no less than ten drivers under me. High point of my career is that till 1997, when I retired, I drove Mercedes only. I was given a letter of appreciation by the Mercedes company for proficient driving of their brand'.*

The producing formation Habi Rahi Limestone is of middle to upper Eocene age. The reservoir is spread over 181417 acres, it is 300 feet thick at a depth of 2053 feet and the gas zone is approximately 177 feet in thickness. The gas itself is dry with 70.6% Methane, 20.1% Nitrogen, 9.0% carbon Dioxide and 0.3 % Ethane. The high percentage of Carbon Dioxide made it perfect for fertilizer industry.[30]The heating value based upon the average of seven wells is 723 BTU. The gas in Mari field is produced from carbonate of Eocene age, the other major gas field (Sui) is also carbonate in nature. One fifth of earth's package of sedimentary rocks are made up of carbonate i.e, limestones and dolomites. Carbonates are born in or close to the environment of deposition.

Engro and Mari

Pakistan itself underwent a transition when the military took over in a bloodless

30 Mari News Quarterly, Volume no.1 issue No.1 October-December 1993.

coup; General later Field Marshall Ayub Khan took over the reins and remained in power till 1967. This decade provided Pakistan with an economic stability, Indus Water Treaty was signed with India, thus marking the beginning of a peace which lasted till 1965, when both countries went to war. One of the major achievement of General Ayub Khan was the introduction of mechanical agriculture in the country. Land holding, distribution and production were all addressed and tractors and fertilizers were introduced. In 1962 the very first oil refinery was commissioned at Karachi followed by another in 1966.

Based upon the gas discovery in Mari, on 21st December 1964, ESSO Eastern's general manager Mr Strasburger gave the details of what was the biggest foreign investment in Pakistan at that time. Esso was to build a new 26 Million US$ fertilizer plant at Daharki, the largest of its kind in the world, scheduled to be operational by the end of 1967. 'The plant will produce 1,75,000 tons urea fertilizer a year'. Esso was to invest 19 Million US$ and remaining was to be invested by the Government of Pakistan.[31] Pak- Stanvac after the discovery of gas at Mari had ventured into petroleum business as well opening new petrol pumps in different cities of the country including Sheihkupura.[32]

The fertilizer plant was dependent upon the newly discovered gas. Mari gas field expansion was launched in December 1965 and completed in March 1966. Five wells were completed and commissioned by the Mothercade Company, later in 1968-69; five more wells were developed providing 39 million cubic feet of gas to the newly commissioned ESSO (Engro) plant. The plant was commissioned on 4th December 1968, its structure having a height of 325 meters is still considered to be the tallest of

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31 New York Times, dated 24th December 1964.

32 Lahore High Court Case No. W.P 18645/2011.

its kind in Pakistan. This plant was a strategic in nature as it ushered Pakistan into the green revolution. The per acre yield from an acre in upper Punjab rose from twenty maunds per acre in 1955 to almost double by end 1970s. Inayat now seventy years old is a Punjabi farmer, he recalls. *' I was young when for the first time Engro fertilizer came , initially farmers were reluctant to use it as they felt that it will have adverse impact on the crop , with passage of time, the yields were so drastically high from the conventional manure that everyone starts using fertilizer and now it is almost unthinkable to do farming without fertilizers*.'[33]

Construction of the Daharki plant provided a big boost to the locals in terms of the job opportunities and economic prosperity. Nassebo is one such person whose life underwent drastic positive changes due to the Marri Gas field. Born in 1944 in an open tent, she was the sixth in hierarchy of her poor family, whose sole substance was either begging or doing petty job on day to day basis. Customarily, the girls in the area are tied into nuptial bonds at an early age, in order to lessen the feeding burden on the family. There was no concept of education, health or sanitation among the thousands of such people living on the edge of poverty and misery. Naseebo like others worked on the construction of the plant along with her other siblings. Now in mid-seventies, she recalled those times. Naseebo who was married a year earlier and had become a widow as her husband died in a road accident. ' *I was in the working class, women in my area are physically tough, I used to carry as much load as other but by and large the company had relaxed policy for women labourers. We would carry the bricks in dozen over our heads, we were paid sometimes daily at times on weekly basis. When I was paid for the first time, I was overwhelmed with joy, this was*

33 Interview with Inayat Ullah in June 2019 at Wazirabad

the first ever pay of my life.' Naseebo, in. a sense remained associated with the Mari Daharki Gas plant from its inception till to date. Her two sons and four grandchildren all worked in Mari; her first grandson was not born in an open tent but in an air-conditioned room of Marri Hospital established by the company for the workers. ' *Mari Company has changed the life of many women in my clan, tribe and area, today we have access to drinking water, and women no more have to undergo the agony of pain and desperation thanks to the hospital and free medicines provided by the Mari. Future of our grandchildren is as bright as anyone living on the face of earth, they are getting good education free of cost and are ensured of having job opportunities in the company*.'

Allah Rakhiyo Khatian joined the Pak-Stanvac in April 1970, 'I am a local Sindhi from Khatian tribe and belongs to an unprivileged but proud family, after the completion of my matric, I could not see any scope of higher education and as such had to join the workforce from an early age, I was hired as a labourer on a daily wage of Rupees one and half. Syed Azhar Hussain Rizvi was in charge of us, a very good man indeed, so much so that amongst the locals Marri Company was known as the Rizvi Company. Mr Syed Ali Hussain Rizvi was the technical manager and joined the Stanvac from its inception, he played an important role in the establishment and development of Mari Gas Field; he retired in October 1993. Another notable was Behram Ali Meerani who belonged to Goth Sain Dino which is two miles from Daharki. Meerani joined the Esso Eastern as a helper in 1968 right after completing his matriculation examination. With the passage of time and through his hardwork earned several promotions and became senior instrument technician by the end of 1994.

In 1967, Government of Pakistan passed an ordinance on 23rd May; Natural Gas Development Surcharge Ordinance. Under this ordinance, natural gas was defined as 'gas obtained from boreholes and wells consisting primarily of hydrocarbons'. 'Every company shall collect and deposit a development surcharge equivalent to the differential price it collected after 31st May 1964'.[34]

It is worth highlighting that majority of international oil companies had left Pakistan after failing to find any worthwhile oil discovery. In 1961, Government of Pakistan in collaboration with Union of Soviet Socialist Russia (USSR) raised Oil and Gas Development Corporation (OGDC). Their first success was in Sarai Singh (Sindh) with little quantity of gas found. The first major oil discovery in Pakistan was made by them in 1968 at Toot (Potohar Punjab). Pakistan Oil Limited also discovered oil at Meyal in 1968. Offshore drilling was also given due attention. It is worth mentioning that very first off shore exploration was carried out by Sun Oil Company in 1961, they later drilled wells at Daboo Creek (1963) Patian Creek (1964) and Korangi Creek (1964). Wintershall a German company conducted seismic survey of 24 folds covering 9400 square kilometres in 1969-72 and drilled three wells namely Indus Marine A1 in 1972 and last one Indus Marine C1 in 1975. Husky of USA carried out seismic survey between 1976-78 of 2,380 square kilometres and drilled one well Karachi South A1 in 1978. Marathon of USA drilled one well at Makran in 1976-77 but abandoned it due to unmanageable outer pressure. However gas condensate discovery at Dhodak in 1977 by OGDC is the only worth highlighting oil discovery of the decade.

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34 Gazette of Pakistan, extraordinary, 23rd May 1967. The National assembly of Pakistan had approved it on the same day.

1971 was an eventful year in the history of Pakistan; the year long civil war started in East Pakistan, rooted in history and blossomed over the economic disparity between the two wings. Daharki gas plants also came under air attack from Indian Air Force. On 9th December 1971 at dusk, two Indian Air Force aircraft appeared on the horizon, there was no anti aircraft artillery present at Daharki, these intruding aircraft made low pass and dropped few bombs which were well off the obvious target (Esso plant) however one worker Allah Dino was killed and other Noor Baksh Mehr was injured due to enemy aircraft strafing.

Post 1971-Mari

In the aftermath of the 1971 War and secession of East Pakistan the country initially underwent a period of gloom, however within a year it was back on its feet. A new democratic regime with a powerful parliament set the pace for progress. In 1973 Arab-Israel War, oil was used as a weapon and as such a new paradigm emerged internationally in which fuel became a security and economic concern. Pakistan was meeting almost 60% of its fuel requirement domestically and as such it boosted the efforts to explore and produce more fuel domestically. In 1974, parliament passed an act authorising government to take over the management of any oil company or to appoint directors , if it feels that such an act is in public interest. It was known as 'an act to provide management and development of marketing facilities in petroleum products'.[35]Government nationalised two oil refineries, and also formed Pakistan State Oil (PSO). Another major step of the government was to establish an institute for hydrocarbon development .[36]

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35 Act No.XVII of 1974, Parliament of Pakistan, *Gazette 8 March 1974.*

36 Hydrocarbon Development Institute of Pakistan (HDIP) was raised in 1975.

In 1976, ESSO approached Government of Pakistan for vesting of its certain undertakings in the country and an agreement was reached under which Government of Pakistan undertook certain liabilities and business less the natural gas operations of the company.[37]Later ESSO was amalgamated into Pakistan State Oil (PSO).

Operationally the Mari Field had initiated its Phase II development plan in 1977, it was carried out to meet the additional requirement of supplying gas to newly commissioned Pak-Saudi Fertilizer at Mirpur Mathello, and it was initiated in November 1977 and completed in February 1978. Nine productive wells were drilled and an additional 80MMSCF were being produced, the expansion had cost Rupees 26.7 million.

In May 1981, Phase III of the development in Mari gas field started and completed in July same year, seven new wells were drilled and completed; the driving force of this phase was the new Fauji Fertilizer plant at Goth Machi which required 90 MMSCF daily. Development phase of Mari in 1981 coincided with the first ever discovery of oil at Khaskheli (Sindh) by Union Texas; it is regarded as watershed event in Pakistan oil history as it negated the existing paradigm that oil is only available in the Potohar region. In the same year (1981) Stanvac merged in ESSO.[38]

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37 Government of Pakistan, *Gazette dated 30th December 1976, Act of Parliament.*

38 Lahore High Court W.P 18645/2011.

Chapter III

Mari Gas Company Limited. 1984-2012

Fauji Foundation traces its roots to post World War II, a fund known as Post War Services Reconstruction Fund(PWSRF) was established by the British to help over a million servicemen of the British Indian Army who took part in the war; after 1947, Pakistan's share was transferred to the new dominion. In 1954, the Government of Pakistan transferred almost quarter of a million US $ to the Pakistan Army for the benefits of retired servicemen. The Pakistan Army wisely instead of disbursing the amount among the servicemen, not only first established a textile mill but later also established a fifty bed tuberculosis hospital at Rawalpindi. Fauji Foundation established a Fauji Fertilizer Company in 1978 and in 1982 inaugurated one of the largest fertilizer plant in Pakistan at Goth Machi , not far from Daharki.[39] Thus when in 1983, ESSO decided to sell off its majority shares(51%) in Mari Gas Field, (the remaining shares 49% were owned by the Government of Pakistan). Fauji Foundation Pakistan saw it as a golden opportunity as it facilitate its newly inaugurated fertilizer plant; decided to purchase shares of ESSO. ' *It was natural that we should have our own gas field for our fertilizer plants, thus when ESSO put forward the idea of selling its shares, I saw it as a god gifted opportunity and convinced my colleagues in the Fauji Foundation and also in the government that we must have these gas fields'.* [40]

There was much deliberation on the nomenclature of the newly raised gas company. Traditionally gas companies at that time were known more by acronyms rather than by name, yet it were the gas fields which caught the public imagination , Sui is one such example. Fauji Foundation also followed the same pattern and named its new company after its gas field; Mari. On 4th December 1984, **Mari Gas Company Limited** was formed as an unlisted public company to take over the assets, liabilities and operational control of the PSPP (Pakistan-Stanvac Petroleum Project) . In the newly formed company, Fauji Foundation had 40%

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39 https://www.fauji.org.pk/fauji/about-us/aboutus-overview

40 Narrated by major General Rao Farman Ali retired during his visit to Mari Gas Company head office at Islamabad on 15th September 1996.

shares, Oil and Gas Development Corporation 20% and Government of Pakistan had the remaining shares. Fauji Foundation had the right to appoint the managing directors. At that time Mari Gas Company had twenty-one gas producing wells, with an output of 200 MMSCF of gas daily; having operating assets worth 140 million Rupees.

Mari Gas Company Limited (MGCL)

Major General Mahmood Aslam Hayat (retired) was appointed as the very first managing director of Mari Gas Company, he remained in chair for the next seven years (December 1985-February 1992); A man of principles and simple taste, there could not have been a better choice of a person for this coveted position than him. He was commissioned in 19 Light Anti Aircraft Regiment in 1951 and with the passage of time commanded anti-aircraft command and also performed the duties of deputy martial law administrator in Sindh. A larger than life figure in every sense, fond of cricket which runs in his family along with soldiery. His personality and above all his integrity won the hearts and minds of all. It is worth mentioning that present Chairman Joint Chief of Staff, General Zubair Mahmood Hayat, is his son.

Transition from ESSO to Mari was smooth, there were no drastic changes in the working environment of the company, the aim of the newly raised company was still the same i.e. to produce natural gas. Mari Gas Field is spread over an area of 943 square kilometres; initial estimates of gas in the field were in the range of 9.7 trillion cubic feet. Phase IV of Mari Gas field development was initiated in October 1985, during which twenty-seven development wells along with three step out wells were drilled, the project was completed in March 1986. The main beneficiary of this expansion was the Water and Power Development Authority (WAPDA) which had commissioned a power plant at Guddu, 100 MMSCF daily was provided by Mari Gas Company. At that time Habib Rahi was the only reservoir from which gas was being produced. Reservoir studies of Habib Rahi were carried out in 1967, 1982 and 1983 by the Core Labs (USA), these studies are extremely important because they assess the availability, quantity and commercial value of the gas in the reservoir. A Gas reservoir is a naturally occurring storage area, characteristically a folded rock formation such as an anticline, that traps and holds natural gas. The reservoir rock must be permeable and porous to

contain gas, and it has to be capped by impervious rock in order to form an effective seal that prevents the gas from escaping upward or laterally. In 1988 another reservoir study was again carried out by the MGCL, it was done by Peterism a US based company.

Mari Gas Company housed its main headquarters in Islamabad (36 Nazimuddin Road, Sector F7/1), a regional office in Karachi (G 9/2, Block 9 Kehkashan Clifton) with its field office at Daharki. Muneer Memon was among the very first employees to be hired by the Mari Gas Company; he appeared for an interview on 5th December 1984. Muneer was a geologist by profession and belonged to interior Sindh, '*I was interviewed at Karachi by a panel, as I got up to leave the interview, the managing director Major General(retired) Hayat along with Major General Rao Farman who was the minister of production and also managing director of Fauji Foundation entered the room, they had few words with me and when they came to know that I am a Sindhi, General Farman immediately appointed me as administration officer at Daharki, despite all my protests*.'

Apart from Mr Munir Memon; Mr Mukhtar Aslam Sheikh joined Mari in the administration department, Mr Khalid Jamil and Mr Shaukat Ali joined the company as accountants, Mr Mohib ur Rab and Mr Ashiq Chaudhry joined the production department. Among the drivers Mr Muhammad Maskeen and Mr Khawaja, Mr Yaqoob Bhutto along with Mr Javed Aslam Shah as clerk and helper were among the initial inductees of Mari Gas Company Limited.[41] This was due to Mari's management's desire to hire educated locals amongst its management cadre.

Inspite of the development in Daharki the overall means of communication were slow. The standard pattern of travelling from Karachi to Mari Gas Field was either by train or road, the strenuous journey consumed almost twelve-fourteen hours. Air travel between Karachi and Sukkur was restricted to one daily flight and there was no direct flights between Islamabad and Sukkur. The law and order situation in interior Sindh at that time was unpredictable; buses, cars and even trains were subject to dacoities and robbers, thus travelling from Karachi to Daharki was nothing less than a nightmare. During this time, elections were held

41 In 1999, all these persons were awarded with fifteen years service awards.

in the country; the system underwent a political transition, a new political government came to power and brought about some much needed changes in the petroleum industry.

In 1989, Government of Pakistan introduced Block bidding system, 43 Blocks were offered, total area under concession was about 1,50,000 square kilometres.[42] Mari did not bid for any block, although there were strong arguments within Mari to bid. One major factor for not taking part in the bidding was the mindset to focus entirely on the existing field rather than any expansion. Later substantial reserves of natural gas were discovered at Qadirpur field not far from Mari gas field by OGDCL Under the petroleum policy of 1991, almost all items required for oil and gas exploration including rigs, seismic equipment, logging trucks, snubbing units were declared duty free.

Under the 1993 Petroleum policy, the country was divided into three zones, Zone I comprised of Balochistan and KPK and was termed as high cost high risk, Zone II depicts Potohar and termed as high cost and medium risk whereas Zone III encompassing the lower Indus Basin was recognised as low cost and low risk. Furthermore the licence for exploration now encompass 7500 square kilometers and leased for three years.[43] It is a matter of interest to note that between 1866-1992 a total of 301 Exploratory Wells were drilled in the area comprising Pakistan, 290 wells were onshore and 11 offshore. By the end of June 1992, the total reserves of natural gas in Pakistan were 31.157 trillion cubic feet. Pakistan was producing 65000 barrels of oil and 1.5 billion cubic feet gas daily, whereas it was importing 64 million barrels of oil; costing 1.8 billion US$ annually.[44]

In 1992 change of command took place, Lieutenant General Hamid Niaz (retired) was appointed as the new managing director, moreover the duration of managing director was set to three years. Appointment of a lieutenant general(retired) highlights the confidence of the Fauji Foundation and the Government of Pakistan in the Mari Gas Company Limited. He took over as the chief executive at a juncture where the Mari had already undertaken the major development project. Speaking of his personality, he is remember for his open

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42 Iqbal Kadri *Petroleum Geology of Pakistan*, Karachi, 1994. pp,10-18.

43 Iqbal Kadri *Petroleum Geology of Pakistan*, pp-367.

44 Petroleum Policy 1991, Ministry of Petroleum.

door policy, easy accessibility and above all his remarkable patience as a listener.[45]

The facilities and production capacity of Mari Gas Field had been gradually and systematically enhanced under four development projects from 1965-1985. In 1992, the Fifth Development Phase of Mari Gas Field was undertaken to supply gas for the expansion projects of Fauji Fertilizer and Engro Chemical Pakistan Limited. The expansion phase comprised of drilling thirteen Development and four Step-out Wells, along with the construction of a Pipeline Gathering System including a Central Manifold No.2 located at a distance of 800 meters from existing Central Manifold. The gas gathering system was thus enhanced from 120 kilometres to 165 kilometres. Financing of the expansion project was through a loan of 19.5 million US$.

Remarkable flexibility is created between two manifolds by inter connecting inlet and outlet headers at both manifolds through two sixteen inch diameter pipelines. This created an ideal facility to switch processed or unprocessed gas from one central manifold to the other central manifold to meet any emergency. The gas from one segment can very easily be switched from header designated for fertilizer to that for WAPDA, facilitating the system to distribute the wells according to their gas composition requirement. Later a comprehensive program was launched to upgrade and harmonize the outlook of these two manifolds. The objective was achieved by hauling of about half a million cubic feet of earth and laying three inches downgraded ballast stone.

Ten development wells were drilled using a hired rig in record time of 75 days. These wells were then connected to the gathering system. As a result, the field capacity was increased from 300 MMSCFD to 400 MMSCFD. The drilling program was designed by the MGCL staff, and the design of the gas gathering system was done by Nova Corporation. The supervision of both the drilling and the construction of gas gathering system was carried out by MGCL personnel, they also installed the Cathodic Protection System of the gas pipelines independently. Better planning and closer supervision of the drilling contractor improved per well drilling time of 7.5 days compared with what was the historical average in the field of about 14

45 Mari News, Volume 1, issue 1, 1993.

days. The cumulative gas produced during the year 1994, from 59 producing wells was 140,017.481 Million Standard Cubic Feet (MMSCF). The daily average gas production for 1994 was 384 MMSCF per day as compared to 355 MMSCF per day in 1993. Engro, Pak-Saudi and Fauji Fertilizers were the main customers of Mari, receiving a committed 300 MSCF daily with WAPDA power plant at Guddu getting the remaining 100 MSCF. [46]

Mr S.M. Salahuddin[47] who had joined Mari in 1990 as planning manager and elevated to as technical manager in 1993 was assigned the overall responsibility to implement the Phase-V. Mr Muhammad Ali Mughul who had joined Mari in 1985 as senior petroleum engineer was the production superintendent and not only he supervised the Phase IV, but he was the team leader for the Phase-V. Another name worth recording is Mr S.M.Jamshed Iqbal who had had joined Mari in 1979, he headed the project development department , 'he has been an anchor person during planning, designing and execution stages of major development phases Phase IV and Phase V'.[48] The development of Mari Gas Field will remain incomplete without highlighting the efforts of Muhammad Ajmal Abbasi, a petroleum engineer who joined Mari in 1980 and was a key figure during the Phase III, IV and V development; he led the reservoir department. Fateh Muhamad Buriro who had been with the Mari since 1982 as operator of heavy equipment was regarded as a model worker during the Phase III, IV and V[49];

First ten years of Mari Gas Company. Mari had increased the number of producing wells from 21 to 59. Its total operating assets increased from 140 million Rupees to 702 million Rupees.

From June 16, 1994 onwards, the shares of Mari Gas Company Limited were being listed and traded on the Karachi Stock Exchange. Under the Privatization Policy of the Government of Pakistan, half of the shares held by the Government were divested and were offered to the general public and the employees of Mari. A temporary 'Shares Department' was established in June 1994 under Company Secretary Mr J.V. Divencha alongwith Mr Muhammad Sadiq, Mr Chiragh Zameen and Mr Rizwan Ali. They did a mammoth

46 Mari News, Volume 1, issue 1, 1993.

47 Mr S.M. Salahuddin, did his Bachelor of Engineering from University of Oklahoma in 1965

48 Mari News, January-March 1994.

49 Mari News, January –March 1994

task of verifying 27,000 transfer deeds, along with registration of transfer numbers in excess of 784,000 shares. The opening price quoted for 4.2 million government shares sold at Rupees 25.15 rupees was rupees 48 and the volume transacted on very first day was 87,000 shares.

Exploring Deeper –Goru B

The deep horizon in Mari Gas Field was never explored, however the discovery of gas at deeper horizon in 1987 by Eni of Italy in 1989 at Kadonwari south of Khairpur followed by OMV of Austria at Miano in 1993 both discoveries in Cretaceous sands acted as catalyst for Mari to explore deeper. Dynamite Seismic Survey of 200 kilometres was conducted in 1995 which confirmed presence of hydrocarbon. Based upon the seismic survey results a drillable structure in the lower Goru sands was identified, The initial assessment was that, there is a Western and Eastern structure at the Cretaceous sands each carrying a conservative reserves of around half trillion cubic feet of gas.

On the 1st of January 1997, Mari was about to reach another landmark by spudding in the deep well. The spirits and sentiments of the people were high on this perfect winter morning. The caravan of jeeps, led by Lieutenant General Ghulam Muhammad Malik (Retired), Managing Director, Mr. Abdul Rehman, General Manager and Mr. Muhammad Ali Mughal, Mari Field Manager, left the Daharki housing colony at about 9:00 a.m. They were closely followed by Mr. Moiz Ahmed, Finance Manager, Mr. Muhammad Ajmal Abbasi, Reservoir Manager, Mr. Liaquat Ali Khan, Project Development Manager, Mr. Tariq Z. Kitchlew, Corrosion Specialist, Lieutenant Colonel Abdul Waheed (retired), Manager Employees Relations, Colonel Amjad Javed (retired), Chief Coordinator and Mr. Khurram Khan, Company Secretary. The destination, about 20 Kilometres from Daharki colony and 11 kilometres South West of central manifold, was marked as Mari Deep -1 Well location. The Managing Director and his associates were warmly welcomed by the confident Drilling Superintendent Mr. Ghafoor Kausar and the energetic duty engineers including Mr. Ashiq Ali Chaudhary, Mr. Javed Iqbal Jadoon, and Mr. Ayub Khan. After the opening ceremony and collective praying for successful completion of the latest venture, the sacrificial goats were slaughtered at the foot of the rig.

The entire team was then escorted up to the derrick floor where they were greeted by the French Crew. Managing Director pulled the drilling brake, the rotary table moved with a thunderous jerk and the whole drilling operation suddenly came to life. This may have been a routine exercise for the old hands, but the deafening noise and knee rattling vibrations at the derrick floor was a rather scary experience for the first timers.

Following the spudding of the well the excitement subsided for a while as the routine operations of daily drilling, logging and testing came into effect. Steadfastly the drilling continued to the prognosed depth of 13500 feet. Following the completion of the final drilling and logging operations a few zones in the Chiltan and one in Sui Main Limestone were selected for drill stem testing .

Mari Deep Well No.1, was completed on 12th July 1997, with a total depth of 13,505 feet. Encouraged by the results of the well, Mari decided to drill a second deep well nine Kilometres north east of the first deep well. The well was spud on 28th October 1997 with a planned depth of 12,800 feet and was completed in February 1998. Under the appraisal programme, six additional deep wells were drilled, four of these deep wells turned out to be gas producers and other two wells went dry. M/s Petresim of USA carried out detail reservoir study and revealed gas reserves of 1.861 TCF . Owing to the quality of gas, the gas from deep wells was dedicated for power sector

With the discovery of gas in the deeper horizon. Mari also finalized the arrangements to conduct a 440 line kilometre 2D seismic survey as a prelude to the development of Goru B reservoir.[50]

Mari's Decade of Exploration & Discovery.2000-12

New millennium was the biggest event of the century, everyone felt a new vigour and sense of achievement to be part of this passing phase of history. Collectively the rise and progress of human civilisation is a matter of pride, it is a unanimous conclusion that this rise is more pronounce in the last two

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50 https://www.dawn.com/news/84705 Dawn Newspaper, March 02,2003. Also see https://propakistani.pk/2017/11/15/mari-petroleum-makes-significant-gas-discovery-sindh/
Business Recorder Karachi, https://fp.brecorder.com/2011/06/201106141201602/
http://www.pakistaneconomist.com/issue2003/issue13/etc6.php

centuries and is synonymous with the exploration of hydrocarbons. The new millennium brought new hope and energy for the Mari and its 316 employees, eleven more than the previous year. With the passage of time Mari had become more of a family for most of them, life and job both were rewarding and satisfying. MPCL had successfully displayed to its shareholders and stakeholders that it is one of the most reliable and profitable E&P company in Pakistan. It had ventured successfully deep beyond Habib Rahi formation into Goru-B to retain the trust of the nation in ensuring continuous supply of natural gas for fertilizer and power plants. At the dawn of new millennium Mari was eager to go deeper and to explore new frontiers.

The four hundred kilometres seismic survey initiated in 1999 in relation with the Goru-B discovery, indicated some additional extension of the reservoir at the South-East end beyond the boundary of the D&P Lease area. The hypothesis was exciting, thus first a Reconnaissance Permit was obtained from the government. The reconnaissance validated the survey, thus Mari applied for and was granted additional 246 square kilometres of land to its already held 969.27 square kilometres of land. This survey indicated some additional extension of the reservoir at the South-East end beyond the boundary of the D&P Lease area. Water Bath Line heater,[51] a technology, was first time introduced installed and commissioned by MGCL at their Deep Well facilities. Six deep appraisal wells were drilled, four of the six wells drilled were gas producers. For effective reservoir management.

In 2001, which is now regarded as a milestone year in Mari's history, Government of Pakistan allowed exploration expenditure of upto 20 Million US$ per year; Mari therefore transitioned truly into an exploration and production company (E&P). Thus Mari in 2001 raised an exploration department, with five geologists and three geophysicists. As a strategy, the explorers decided to work on a regional scale, thus regional geological and geophysical data was purchased and integrated.

Till 2005, fourteen applications for operatorship, 23 areas to farm-in as a joint venture partnership and 26 blocks for farm-in were reviewed. By the end of 2005, Mari had ventured outside the Mari Development and Production Lease area for the first time in its history when it acquired operator exploratory license of

51 These line heaters designed to boost-up temperature of gas up to 140° F at different gas flow rates

Karak and Noor Blocks. It also acquired 60% in Ziarat and 35 % share in Bolan exploratory licenses; as operator and partner. Mari had also entered as joint venture partner(J.V.Partner) in nine other exploratory licenses including Dadhar, Nawabshah, Hala, Zamurdan, Kohlu, Kalchas, Kot Sarang , Pasni and Makran; last two being offshore licenses.[52]

Expansion

An important and much needed requisite for expansion was the rehabilitation of the gas pipelines. By 2001, these pipes had completed 35 years of service; more than anything else it was a matter of safety of the pipelines. A, C-scan survey was conducted to ascertain the condition of wrapping and coating, based upon this the first phase of the rehabilitation of pipelines was initiated in July 2001. By the end of 2004, over ninety thousand feet of pipeline was rehabilitated. Pigging was required on certain wells flowlines due to high water production, pig launching and receiving facility was constructed at well No.11.[53]The whole operation was designed, fabricated and commissioned through in-house expertise; existing material in Pipri warehouse was used and no new material was procured. In the same breath, the warehouse at Pipri was also upgraded.[54]

Coinciding with the new millennium and newly approved financial freedom for exploration, Mari initiated its **Phase VI** development for Habib Rahi Reservoir in order to enhance its production from 459 to 495 MMSCF; seventeen wells had to be dug apart from hooking two deep wells .[55] An expansion programme is much debated and thoroughly planned down to the minutest detail, just to highlight this point, no less than 25,000 gallons of fresh water is required daily for the drilling of one well. Thus there are pre – spud preparations which includes topographical survey, acquisition and demarcation of land, preparation of location which in this phase included preparation of over 50 kilometres of track amidst sand dunes for heavy

52 Mari Gas Company Limited(MGCL) *Annual Reports for the Year 2004, 2005, 2006*.

53 Well No.12,48 and 73

54 Mari News, Volume No.1 Issue No.1 June-December 2004.

55 Mari Deep 10 and 11 in Habib Rahi Reservoir had to hooked up with the gathering system

traffic including Mari Rig. Crew of Mari Rig deserves applause for their untiring, focused, professional and dedication; they rewrote the history and set new record for speedy drilling. Rig was in fact zigzagged through cultivated land, sand dunes and water logged area; they were able to complete move in unprecedented 10-12 hours. Drilling requires a constant and heavy flow of spares and related material, ' in a single day eighty trailers of tubular were unloaded'. Drilling Phase started with drilling at Well No.90, ' after the first fast in, the rig and its crew never looked back'[56] . Well No.86 was the last well to be drilled.

Laying of gathering system and fabrication of well site facilities were the culminating act of this expansion project. No less than 1,46,000 feet of pipe lines ranging in diameter from six to sixteen inches were laid; later they all were hydrostatically tested. The Achilles Heel of the expansion regime in the end was the high percentage of carbon dioxide in these eighteen wells; it was higher than the permissible ' MGCL could not have attained the maximum production capacity owing to the high percentage'.[57] This Gordon Knot was broken by Mari's own expertise, equipment and human resource. Modification was carried in gathering network thus shifting high carbon dioxide content gas after taking into consideration the behaviour of each well from Manifold No.1 to No.2 and vice versa. *'The job accomplished , not only created enormous operational flexibility but also enabled us to implement the production plan in its true spirit*.'[58]

Discovery

Exploration is mixed bag of fortune and misfortunes, success and failure, hope and despair, joy and sorrow ; and Mari is no exception. The Pasni X-2 exploration well was spud in February 2005. By September same year, drilling having encountered various unexpected problems and bad sea weather conditions managed to reach the depth of 4,000 meters but the target sandstone reservoir was not present. Since the well proved unsuccessful, it was thus plugged and abandoned. Zarghun on the other end is a success story, Mari was able to discover not only gas but also oil for the first time

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56 Ashiq Choudhry, Captain (retired) Riffat Hussain *Phase VI Development Project* Mari News, June 2004.

57 Permissible limit is 10 %

58 Ashiq Choudhry, Ayub Khan *Mari News.* December 2004.

In 2005, Mari made another gas discovery in its lease area in Sui and Pirkoh Limestone formations. The well was spudded on February 16, 2005 and drilled down to 1,268 meters within a record period of 16 days. Gas discovery in Pirkoh Limestone was one of the shallowest and first ever discovery in this formation. Extended well testing was conducted for the duration of forty days and average production of well was six MMSCFD from Sui Main Limestone and 2.5 MMSCFD from Pirkoh Limestone. [59]

Drilling, completion and hook up of three Pirkoh Wells and three prospects at Pirkoh Limestone reservoir were identified. After necessary planning and arrangement of services, drilling of well MG(P)-1, MP-1 and MPX-1 commenced on May 12, 2013 and successfully completed on July 02, 2013 by using Mari's own Skytop Brewster Rig and crew. Successful Drill Stems Test (DST) by perforating Pirkoh Limestone was carried out, which resulted in gas flow from all the three wells. These wells were hooked up with existing gas gathering network at Mari D&P. The cumulative production from the said discoveries to national grid system was approximately 6 MMSCFD. After strenuous efforts, Mari was able to hook up well # 85 with the gas gathering network after twenty seven years. The well was drilled in 1986 but the gas could not be tapped due to certain unavoidable circumstances. The well later contributed 9 MMSCF gas per day.

Sui Main Limestone (SML)

Previously, there was a perception that SML reservoir quality deteriorates from Qadirpur Gas Field to Mari D&P Lease area. This perception was changed when well data within and around Mari D&P Lease area were reviewed. As a result of the comprehensive study, a prospective area was identified at SML and PKL levels in the western part of the Mari D&P Lease based on the vintage seismic data interpretation. All the wells over the identified prospective area were drilled down to Habib Rahi Limestone at shallower level except Mari Deep Well # 6. Mari SML Well -1 was spudded on February 16, 2005 and reached total depth of 1,268 meters in Ranikot Formation of Paleocene age within a short span of eighteen days. Considering the encouraging log results, three zones that are Pirkoh, Sui Upper and Sui Main Limestones were tested, which flowed gas at a cumulative rate of around 6 MMSCF per day. This significant discovery supplements

59 https://innspub.net/jbes/sedimentology-pir-koh-formation-exposed-dholi-rakhi-gaj-central-sulaiman-range-pakistan/

Mari's existing producible reserves in Habib Rahi Limestone and the proven reserves of Lower Goru "B" Sands.

All these efforts and studies finally bore fruit when on 21st June 2006 , Government of Pakistan awarded the Petroleum Exploration Licenses for Sujawal , Hanna and Harnai blocks to Mari as operator with full working interest; Mari planned to invest approximately US $ 208 million in the next five years. Purchase of Rig from China in 2007 was the next major step and it was not the last rig to be purchased as another one, even more powerful was added to the inventory soon.

Unfortunately, mid of new decade was also the end of the classic era of exploration in Pakistan. The aftermath of the US War on Terror emerged in Pakistan as a new form of terrorism and armed radicalism. In Baluchistan, it started at the end of 2004 in the Gwadar area and soon spread into Bugti and Marri tribal territory which is heart of natural gas in Pakistan. In KPK, it had practically ceased the exploration of oil and gas. Punjab and Sindh remained relatively calm but there was the ever present fear of installations and teams being targeted by terrorists. Mari Gas Company in its last year before it transitioned into Mari Petroleum Company Limited had become the third largest among the twenty five odd exploration and production (E&P) companies operating in Pakistan.

Chapter IV

Mari Petroleum Company Limited

November 12th, 2012 is a remarkable day in the history of Mari when Mari Gas Company became Mari Petroleum Company Limited with Lieutenant General retired Raza Muhammad Khan as its first managing director. The decision to have a new identity itself was much debated and deliberated thought as change of name can be an economic marvel or a corporate suicide. Mari Gas has been engraved and etched in the common and corporate mind, Mari is synonymous with the highest social and ethical values prevalent in the oil & gas sector today; these social and ethical values have been nurtured and instilled in Mari for over five decades.

Another proponent of the argument was the changing environment where recent discoveries of oil and condensate in Khost and Sujawal acted as a game changer and catalyst to have a more appropriatev outlook; at least etymologically. In the strict sense the word, "hydrocarbon" is more appropriate as it encompass both oil and gas. However commercially the word Petroleum has more glamour to it than Gas, although petroleum in its strict sense relates to oil or liquid. In the end it was decided that word Mari would be retained and the word gas would be replaced by petroleum. Coincidentally, with this transition in name, a new state of the art head office comprising of six storeys was also commissioned; thus transition from gas to petroleum was now completed. A new logo designed by renowned artist Miss Nargis was also adopted.

Over the past half century the petroleum industry has played a significant role in national development by making large indigenous gas discoveries. These sources are supplying gas to consumption centres through 9,843 kilometers transmission networks and 71,863 kilometers of distribution system. Pakistan meets about 15% of its oil demand from local sources. Oil and Gas are major components of Pakistan's energy mix, meeting over 79% of energy needs.

This change of nomenclature proved its merits, it brought a change in everyone's outlook from the managing director right down to the company man and tool pusher. It was a repetition of history, a similar

excitement was in the air in 2001 when financial freedom in exploration was granted to Mari. In 2013, the most prominent achievements were the formation of Mari Seismic Unit department and the acquisition and commissioning of a 2500 horsepower rig. The cumulative impact of this resulted in an unprecedented rise in the shares of Mari to Rupees. 293 on 16th August 2013. The science of Seismic Exploration is in essence based on the elastic-wave phenomenon and its applications in exploring subsurface geological structures with what they contain from minerals, water, and hydrocarbon deposits. The first scientist who investigated the elastic behaviour of bodies is Galileo (1564–1642), In the year (132 AD), the Chinese philosopher Chang Heng devised a detection instrument to detect the arriving earthquake impulse marking the first step in instrumental seismology.[60]

On 5th December 2015, Mari Seismic Unit (MSU) carried out a successful 3D Seismic covering an area of 1,079 square kilometres; this project generated an impressive profit of Rs. 730 million. [61] This seismic data provided a new insight into the of subsurface formations and led to the drilling of four wells during the year 2016-17 in SML and SUL Formations .This maiden success acted as catalyst and in the next year 528 square kilometres of area in Sujawal Block was completed well in advance, by doing so the crew of MSU setup a national level record of production by having 1014 shots in a single day. Main and important achievement of MSU is in carrying out work in high threat risk areas of KPK and Baluchistan. These areas are generally perceived to have high reserves of gas with high ratio of success, but majority of E&P companies avoid working in these areas due to the hostile security situation. As a result of aggressive exploration strategy, nine wells were planned for 2016-17, out of which, eight wells were drilled . Tipu-1 Exploratory Well in Mari D&P lease was spud-in on 5th July 2017 to test the hydrocarbon potential of Lower Goru B & Massive Sands, SML and Sembar Formation down to the depth of 3,950 meters.

Mari due to its longstanding tradition continued its un-interrupted gas supply to all its customers during the year 2016-17. A cumulative 231,147 MMSCF of gas at a daily average of 633 MMSCF and

[60] Hamad Alsadi *Seismic Hydrocarbon Exploration* (Springer Switzerland,2011).pp,2-14.
[61] Mari Annual report 2016, p-40.

16,149 bbl of condensate (44 bbl/d) were produced from Mari Field during the year. In addition, 461,771 bbl of crude oil (1,265 bbl/d), 76,161 bbl of condensate (209 bbl/d), 12,688 MMSCF of gas (35 MMSCF per day) and 20 metric ton of LPG (0.05 metric ton per day) was produced and sold from joint ventures during the year,

Mari's customers include Engro Fertilizer, Fauji Fertilizer, , Fatima Fertilizer, Foundation Power Daharki Central Power Generation, Sui Northern Gas Pipelines, Sui Southern Gas , Attock Refinery, National Refinery, Pakistan Refinery, Pak Arab Refinery , Western Power, Petrosin CNG (Private) and Foundation Gas. Mari achieved its highest ever production of 746.50 MMSCF of gas on 26th June, 2017. Average daily production from HRL reservoirs remained 573 MMSCFD during the financial year 2016-17.

Primarily, Mari is an exploration and production company in the upstream segment of the petroleum industry. Mari's mission is to enhance exploration and production by breakthroughs in knowledge and technical innovations with an aim to maximise revenues and return to the shareholders whilst maintaining highest standards of health, safety and environment. Apart from natural gas, it also produces crude oil, condensate and liquid petroleum gas, however all products of the Mari are generic and supplied to downstream customers without any brand name.

Mari is a transparent company where all financial transactions are accurately reflected in the annual reports and Mari has won many national awards on its annual report. . Mari as a principle and policy remains aloof of the politics , **'Company shall not make payments or other contributions to political parties and organisations'.** Oil and gas industry by nature is a risky business as it is subject to international geopolitics with resultant swing in oil prices as happened in 2015; thus diversification in associated activities offer to lessen the risk. Mari is now entering into the Mari X development project to extend the plateau period of Habib Rahi Limestone reservoir. By end August 2018, three new wells out of planned 19 wells had been drilled and connected into the system.

Mari Gas Field alone generates 95 % of the company's production and generate 89% of its revenues. It is the greatest source of income for MPCL as well as its Achilles Heel. To counter the overall dependence

on a single field which is naturally bound to deplete with passage of time, Mari has increased its budget of exploration from USD $ 249M to USD$ 371M. Mari looked at international field, in exploration and production, it signed memorandum of understanding with MOL Group of Hungry, Kuwait Foreign Petroleum Exploration Company and Polish Oil and Gas Company. The American IPR Energy Resources and Tullow have shown interest in bidding jointly with Mari for certain international blocks.

22nd January 2018, was a historic day as Honourable Prime Minster Shahid Khaqan Abbassi visited Mari Headquarters, becoming the first ever Prime Minister of Pakistan to be a guest at Mari. He came to attend a presentation given by PPEPCA. In eighties the leading oil and gas companies in Pakistan including Mari made an effort to have a joint and uniform forum to debate over the oil and gas exploration and production related issues. In 1988 it was originally conceived under the name and style of Pakistan Exploration and Production Companies Advisory Committee (PEPCAC) as a representative body of local and foreign companies engaged in exploration and production of petroleum. Its establishment was an important Landmark in the history of petroleum industry of Pakistan. It was culmination of endeavours, spread over a long period, of five private sector companies namely; Mari Gas, Oxy, POL, PPL, UTP and OGDCL a public sector company. In May 1995, the organization was converted into a company, limited by guarantee, without any share capital, through the blessing of Ministry of Petroleum & Natural Resources under the new title of 'Pakistan Petroleum Exploration and Production Companies Association.[62]

In 2018, Mari successfully negotiated with other E&P companies to acquire working interests in Bannu West, Block-28, Kalchas, Kohat, Ghauri, Bela West and Sukkur Blocks. In the larger national interest, despite security and terrain related challenges, Mari is aggressively undertaking 3D seismic data acquisition in North Waziristan area of FATA with a plan to drill 1st exploratory well hopefully by end 2019. Preparations are also in hand to open up the strategic Block-28 in Balochistan, where activities are on halt since long due to security reasons. Some of leading international E&P companies such as MOL, OMV, Eni, KUFPEC, Tullow etc left Pakistan due to multiple reasons. Mari have been making efforts to bring

[62] Official web site of PPEPCA https://www.ppepca.com/aboutppepca.html

these companies back finally signing MOUs with three international companies including MOL (Hungry), KUFPEC (Kuwait) and Polish Oil & Gas (Poland) for strategic cooperation and joint evaluation of business opportunities within Pakistan and abroad. For financial year 2017-18, Mari paid highest ever dividend of 60%. In addition to the handsome dividend, it also issued 10% Bonus Shares to the shareholders. No wonder then that Mari enjoys unprecedented confidence of the investors with highest share price in listed petroleum companies from all streams and current market capitalization of over Rupees. 160 Billion. Plimsoll, a UK based leading analyst firm, has recently issued their latest report containing the financial analysis of 330 companies of the world based on their published annual accounts. They have ranked Mari as 29th most profitable Company .

In September 2018, Mari made a landmark crude oil discovery in Ziarat Block near Quetta. The important aspect of this discovery is that this is the first ever oil discovery in Chiltan and Moro/MughalKot formations in Balochistan Province. In the recently concluded financial year, Mari discovered substantial new gas reserves at exploratory well Tipu-1, unlocked upside potential at Bhittai-5 appraisal well and also completed Azadi-1 development well, all in Mari D&P lease area.

Mari 2019 and Beyond.

Mari Petroleum Company Limited (MPCL) is operating seven (07) oil & gas/condensate fields which are Mari Field, Daharki, Zarghun Gas & Condensate Field, Sujawal Gas & Condensate Field, Koonj Gas field, Ghauri Oil Field, Halini Oil Field and Kalabagh Gas & Condensate Field in all four provinces of Pakistan. Daily gas production of MPCL from its operated fields stands at around 680 MMSCFD of gas & 2400 Bbls of oil/condensate per day.[63]

Mari Petroleum takes great pride in its successful operations spread across the country, and for being the operator of the country's largest gas reservoir in terms of balance reserves of 5.1 TCF at Mari Field, Daharki. With the highest exploration success rate of around 70%, Mari have been providing uninterrupted

[63] http://fauji.org.pk/test/mari-petroleum-company-limited

gas supply from Mari Field for over five decades. Due to efficient operating methodology and proficient management, for the first time in the history of the company, Gross Sales exceeded Rupees. 100 billion mark during the recently concluded financial year. Profit-After-Tax also recorded a substantial increase of 68%, jumping from Rupees. 9 billion to Rupees. 15 billion. Mari also maintained its distinction of being the most cost effective E&P Company in the country, with operating expenses at less than 10% of the gross sales, and the lowest cost per barrel of production. At Mari, whatever is done is as much dictated by National Interests as by commercial considerations.

3rd January 2019 , a Historic Day

Thursday 3rd January 2019 stands out as a historic and memorable day in the history of Mari Petroleum Company Limited , Chief of Army Staff General Qamar Javed Bajwa Nishan-e-Imtiaz (Military) Hilal-e-Imtiaz (Military) visited Mari's headquarters , it is the first ever visit of an army chief in the history of company. On arrival he was received by the Managing Director Lieutenant General (retired) Ishfaq Nadeem and was given a detailed briefing. General Bajwa was apprised on the magnificent growth that Mari has attained over the decades, . '*We are now a Billion Dollar company , having second largest gas reserves in Pakistan, with 130 producing wells . The role of Mari in ensuring the food security of the country was also highlighted , the fact that nineteen new wells are being drilled is a testimony to the efforts. MD with pride informed that Mari has been declared the best company in corporate sector for last three years in succession. MD also highlighted the contribution Mari is making in improving the quality of life in the area of operations in which so far over 1.3 Billion rupees have been spent so far on the health and education*.'

General Qamar Bajwa listened with keen interest and appreciated the efforts and contributions of Mari towards national economy especially its plans for diversifying the business and for contributing back to the country. He acclaimed the leadership of Mari and its team for their unremitting and persistent efforts to meet the energy and food security challenges of Pakistan by providing uninterrupted gas supply in last five decades. General Qamar Bajwa hails from a Jat family in Ghakkar and as such is very familiar with the impact of fertilizers in improving the everyday life of farmers. He also shared his memories when the

fertilizers were first introduced in the agriculture and how farmers were reluctant to use it and now the perspective has change and at present without fertilizers the farmer is handicapped .

Mari continue to play a pivotal role in ensuring the food and energy security of the Country. Not only the gas supplied from Mari Field is utilized for producing more than 80% urea in the Country, but cumulative daily production of around 100,000 barrels of oil equivalent helps Government save precious foreign exchange worth billions of rupees every year. In this regard, the importance and critical role of Mari Gas Field cannot be over-emphasized. Mari Field is in uninterrupted production for over 50 years. The production was projected to start declining from 2019 onwards. To avert such a situation, immediate intervention was needed. Mari undertook an exhaustive in-house reservoir simulation study, and came up with a plan to drill additional development wells, along with undertaking debottlenecking and upgradation of gathering and production facilities at a substantial investment of **US$ 100 million**. Successful completion of this project would extend Mari production plateau by an additional 4-5 years, so far 13 out of 19 wells have been completed, and the results are in line with forecasts.

In 2019, Mari is managing the largest gas reserves of Pakistan at Daharki in Sindh, currently having 18% share of total natural gas in Pakistan. The current production is equivalent to115, 505, 000 bbl/d. Mari's exploration success rate is 70% which is the highest amongst all companies working in the Pakistan, whereas the average industry success rate is around 33%. At present, there are 29 E&P companies in country amongst which 11 are local.[64] Mari also has the lowest operational cost of 10% of its gross sales. Mari is listed on Pakistan Stock Exchange with a market capital of around 170 Billion Rupees (1.2 US $ Billion). On 30th January 2018, the highest ever output of 770 million gas cubic feet was achieved and throughout the year a daily average of 713 million cubic feet was maintained. This enabled Mari to post an increase in profit after paying taxes of 68.28%(Rs. 15.4 Billions). Mari crossed the Rs. 100 Billion mark in that year and shareholders dividend increased to 60 %.

64 Mari Petroleum Company Annual report 2018.

Effective management of risks is a fundamental component of good corporate governance and is vital for the Mari's continued growth and success. Mari in 2018-19 hired the services of I-Risk Group, a UK based International Risk Consultancy Firm to review existing risk management practices, and impart necessary trainings to its staff. The consultants have completed their assignment and the Project is now in implementation phase in the light of improvement road map agreed with the consultants.

Laurels and Awards

MPCL participated in the **11th National Forum for Environment & Health (NFEH) CSR Awards 2019**, held at Serena Hotel Islamabad on 24th January 2019. The event was graced by the President of Pakistan, Dr. Arif Alvi as the Chief Guest and President AJK Sardar Masood Khan, as the Guest of Honor, who also distributed the Awards. MPCL won three prestigious Awards. **Best CSR & Sustainability Award 2017-18**. The Award was received by Brigadier Shaheryar Khan (R), SI (M) – General Manager (Administration & Security). Sports initiatives recently undertaken by MPCL have been recognized at the Awards. **Sports & Recreational Activities Award** was received by Brigadier Saleem Nawaz (R) – Senior Consultant (Sports). The only other company to receive this Award was National Bank of Pakistan. MPCL secured **Advanced Level** in the ISO 26000 CSR Assessment in 2017. The only Company to have achieved this milestone. Thus, the **Best CSR Practices** Award was conferred to MPCL for this feat, which was received by Mr. Usman Aslam – Senior Sustainability & CSR Specialist. It is worth noting that MPCL was the only organization to secure these many awards at the Event. MPCL being the major sponsor of the event received the **Sponsorship Shield**, which was presented by the President of Pakistan to Mr. Assad Rabbani – General Manager Corporate Affairs. The Awards received, demonstrate Mari's resolve and commitment in improving the lives of marginalized communities.

At the "14th EFP Best Practices Awards on Occupational Safety and Heath" ceremony, organized by the Employers' Federation of Pakistan on April 26, 2019 at Marriot Hotel Karachi. Mr. Shafqat Mehmood,

Federal Minster for Education and Professional Training was the Chief Guest at the Event which was attended by a large number of dignitaries from the corporate world. Mari has won several sector specific awards in the past for its HSE practices. However, this year, Mari has bagged **Overall Platinum Award** which is the highest award in overall category. MPCL was declared winner on the basis of a transparent evaluation of nomination papers submitted by all the participating companies. The evaluation was carried out by an independent jury.

Mari won two prestigious awards, **"Prime Minister's Award for Corporate Excellence"** and **"Fastest Growing Company of the Year Award"** at 32nd Rawalpindi Chamber of Commerce and Industry (RCCI) International Achievement Awards 2019. The awards were conferred by **His Excellency Dr. Mahathir bin Mohamad, Prime Minister of Malaysia**, at an impressive ceremony held on July 09, 2019, in Kuala Lumpur, Malaysia. MPCL was the only Company to have received **"Prime Minister's Award for Corporate Excellence"** which was the highest category award.

In May 2019 , this all transformed into a fact when MPCL for the first time in its history was included in top 25 companies on Pakistan Stock Exchange, it was placed at No.16 Position for the year 2017.[65]

[65] https://mpcl.com.pk/2019/05/23/top-25-companies-on-pakistan-stock-exchange-for-the-year-2017/

Chapter V

Fields, Wells and Rigs of Mari

In its strictest sense, petroleum includes only crude oil, but in common usage it includes all liquid, gaseous, and solid (e.g., paraffin) hydrocarbons. Under surface pressure and temperature conditions, lighter hydrocarbons methane, ethane, propane and butane occur as gases, while pentane and heavier ones are in the form of liquids or solids. Although there are some important Precambrian and Palaeozoic rocks in Pakistan, the bulk of the country is dominated by the effects of the India-Asia collision. A collision mountain belt comprising the Himalaya, Karakoram and Hindukush Ranges forms its northern part.

Pakistan is endowed with three major Sedimentary Basins which covers 827,000 square kilometres[66], namely Indus Basin in the east extending into India, Balochistan Basin on the west extending into Afghanistan & Iran and Pishin Basin in the north-west which extends into Afghanistan. At the time of independence only 28% of the area was known geologically .[67] The geological setting of Pakistan, in the framework of the modem concept of Plate Tectonics, is rare and matchless in the world. It is in the sense that within an area of about 800000 square kilometres critical tectonic junctions of different interacting plates and micro-plates arc present in a unique environment, where field exposures are excellent and the accessibility is easy.[68]

[66] Ministry of Petroleum and Natural Resources *Opportunities in Pakistan's upstream Oil and Gas sector*
[67] Geological Bulletin Punjab University, No.18, 1983
[68] Government of Pakistan Ministry of Petroleum and Natural Resources *Stratigraphy of Pakistan* (Geological Survey of Pakistan, Islamabad, 2009). PP-2-30

Balochistan – Parched Civilisation

Balochistan is the most ancient of all civilisation known to mankind, a civilisation which died because of lack of water. The thousand years old trees in Ziarat, the dried bowls of once alive lakes, the mountains that have outlived their life and now approaching a dusty grave are all evidences that once this land was full of life. Balochistan history is linked with Persia and Aryans. Baluchistan first emerged in history with the expedition of Semiris , Queen of Mesopotamia in 900 B.C., she is reported to have invaded India and retreated through the coastline, being able to survive with twenty odd followers. The next detail description about Balochistan emerges through the campaigns of Alexander The Great, who in his retreat adopted the coastal route. His land journey in 325 B.C. took him from the present day Karachi , Bela , Kalat , Makran (Gedrosia) and Gwadar area. Greeks were constantly harassed by hostile population, scarcity of water was so acute that Alexander's troops again mutinied for drops of water. In 1838, the British East India Company decided to put a ruler of their favour in Kabul , per force they had to adopt the Sukkur-Sibi-Bolan-Quetta-Kandahar route. This is the first detailed account of present day Balochistan. Just on the eve of Second Afghan War, a treaty was reached between the British and Khan of Kalat at Mastung in 1876.[69] The Baloch Sardars and Khan of Kalat agreed to accept the mediation of British government in their common disputes rather than the Afghan government. Balochistan thus became the very first political agency to be raised and established by the British , Robert Sandeman became the first agent to governor general (AGG). Khan of Kalat had leased certain territories to British and they formed the agency. Sandeman established his headquarters at Quetta a distance of 100 miles west of Kalat.[70] British India had entered in treaty with Iran over the borders in 1871, 1896 and 1905.[71] The initial settlement of frontier of Balochistan with Persia took place in 1871, Major General Fredrick Goldsmid was the main negotiator from British India side, the line thus is named after him. After 1947, Pakistan inherited almost 590 miles of border with Iran. Pakistan in an act of goodwill entered into new agreement with Iran on the border

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69 Issac Bruce „, *The Forward Policy and its results or thirty Five Years work amongst the tribes on our North Western Frontier of India, first edition 1900.Quetta: Gosha –e-Adab, 1977*

70 Charles Dilke, *The Baluch and Afghan Frontiers of India, (Littels Living Age American Periodical), May 4th 1889, p- 287.*

71 Mujtaba ,Razvi, *The Frontiers of Pakistan, a Study of Frontiers Problem in Pakistan Foreign Policy (National Publishing House,Karachi,1971)pp,144-145.*

demarcation. Pakistan withdrew its passport officials 87 miles behind the border and later withdrew Chagai Militia to Jozak 11 miles inside border.[72]

Balochistan is Pakistan's largest province and geologically it's the oldest tracing its origin to the ice age. Baloch literary means wanderer. Balochistan covers an area of 347,188 square kilometers (larger than England) with a population of 4.3 million (5.14% of Pakistan's total population). The average population density of 12 persons per kilometer is one of the lowest in the world. Province is mainly barren, rugged, desert, and mountainous. Annual rain fall is 2-4 inches and temperature soars to 55 degree Celsius in summers and dropping to below zero in winters. In north it is bounded by North Western Frontier Province, on the west is Afghanistan and Iran, in the south a coastline of over 470 miles with Arabian Sea and towards east are Sind and Punjab. Balochistan is like a big bowl protected by mountain ranges all around varying from 2000 meters to 4000 meters and only through passes caravans can enter. Province can be divided into three distinct linguistic groups namely Pakhtuns in the North and along Durand Line having a population of 0.8 million with their chief tribes settled in Zhob and Chaman. Brahuis are about 0.9 million and occupy coastline and central area including Kalat, Kharan, Makran and Bela they speak Brahui. The third is the Baloch tribes from which the province derives its name, are settled along the western mountain ranges of Indus Valley. They claim their descent from Aleppo of Syria[73] and have population of 0.7 million. The chief tribes are 'Bugtis' and 'Marris'. Some of Baloch tribes are also settled in Iranian province of Siestan. Baloch are tall, strong, having long well oiled hair and curly beard. They put on white long flowing robes accompanied by arms and are excellent riders. For over two centuries they resisted British and retained their independent way of life. In the absence of agricultural land they live nomadic life. All along Baluchistan they follow tribal bond of honour.

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72 *Ibid,p 206*

73 Gulshan Majeed *National Integration in Pakistan, a Socio-Political analysis of Balochistan* . Ph.D Thesis Punjab University, September 2011. P-58

The term Baloch is a derivate Belus, the title of Babylonian , followers of Nimrod used to be called as Belusis and in Arab literature they were known as Balos. all this along with the fact that ruins of Mehrgarh in Balochistan further augment the hypothesis that Balochistan was the cradle of civilization which later perished with the scarcity of water.[74]

Geology of Balochistan

Geologically Balochistan is part of Triassic to recent strata with different tectonometallic and sedimentary basins like Baluchistan basin, Indus Suture, Suleiman and Kirthar Basins.[75] Balochistan is the richest province among all others in terms of minerals, with large proven reserves of gold, ingenious iron, copper, lead, zinc, barite, chromite, coal, gypsum, marble, ochre, silica sand. 58% of Pakistan coal production comes from this province apart from first and huge deposits of gypsum in Pakistan in Suleiman foldbelt. On the coast, Makran Mud volcanoes are quite common, they are also found in Pishin –Zhob basin. Petroleum seeps were first reported at Moghuls Kot, Khattan, Gokurt and Sanni alongwith bituminious staining in the Sanjwani and Duki.

Balochistan Basin covers an area of 2S0000 square kilometers and is roughly delineated between Axial Belt of Pakistan to the east and the Lut Block of Iran in the west. The Balochistan Basin is bounded by Afghanistan in the north and Arabian Sea to the south. the evolution of Balochistan Basin is obscure prior to Jurassic.

Mari's Zarghun

Zarghun gas field is located 50 kilometers north east of Quetta city. The fields are spread over Harnai and Sibi Tehsils and area is the seam of Baluchi and Pashtun tribes. [76] Zarghun itself forms part of Bolan Block. Discovery of hydrocarbons was first made by a British-Kuwait consortium (Premier Kufpec) in

[74] Ibid.

[75] Muhammad Sadiq Malikani, *Stratigraphy, Mineral Potential, Geological history and paleobiography of Balochistan province, Pakistan*. Sindh University Research Journal (Science Series) volume .43(2)269-290(2011)

[76] Mari Annual report 2014.

1998. The First exploratory well Zarghun South-1 was planned on the structure and drilling commenced on 4th June 1998. The well reached its target depth of 2094 meters on 8th August 1998. The testing revealed gas in Dunghan oro/Mughal Kot and Chiltan reservoirs and flowed gas at a maximum rate of 16.7 MMSCF per day. The second well Zarghun South-2 was also drilled successfully in 2000.

In 2003 Mari acquired the operatorship of the block through formation of Bolan Block Joint Venture. The prospects were challenging as it required installations of a processing plant and transportation of gas itself to the tie-in point ; involving a distance of 64 Kilometers through mountains. In August 2006 an agreement was signed between Mari and SSGL underwhich later agreed to purchase the gas from Zarghun and also agreed to share the cost of pipe laying.[77] The President General Pervez Musharraf inaugurated the commencement of development of Zarghun Gas Field on December 8th 2006.

All these plans were put into motion when miscreant attacks halted the activities. In 2009, the cost of the field development project had risen to 40 Million US$, resultantly the entire project looked uneconomical. Mari in order to overcome the cost initiated an 'out of box' solution, ; thus undertaking development of the field through its own in-house resources. Engineering , procurement, site supervision were thus performed by Mari itself. ' MPCL took this as a challenge , by relaunching the project'. [78] , coincidentally the Tight Gas Policy was also announced in 2012 and Zarghun Gas Field qualified for higher price, thus all of a sudden the valuation of Dunghan reservoir improved dramatically. In 2013 , Mari relaunched the project , security was the primary concern and the whole success of the operation relied upon it. Brigadier (retired) Salimullah the resident director of Mari at Quetta played an important role in co-ordinating various strands of security. Frontier Corps Baluchistan deserves special gratitude in this regards along with ' Gallant' Army Aviation squadron at Khalid Air Base. Camp establishment and mobilisation of personnel was completed by October 2013 and by end February 2014 civil works were completed, it goes to the credit of entire team to finish it in time despite a harsh cold weather. Heavy snow often cuts off the camp from the Quetta, in such environment , mechanical construction of piping, construction works for civil, mechanical and electrical

[77] https://www.dawn.com/news/207891
[78] Ibid.

activities were undertaken by Mari. ‘ varying obstacles were encountered during this stage, attacks from miscreants, adverse weather, delay in shipments’.

26th August 2014 is a historical day in Mari’s history when supply of gas from Zarghun to Quetta City was made possible, by suppling gas to the SSGC . For the record it is worth recording that entire project has been completed by Mari at an astonishingly low cost of US$23 Million in 2014 as compared to contractor quoted US40 Million in 2009. In September 2016, Zarghun South (ZS) a development well was spud- in. ZS-3 is the first ever highly slant well drilled by Mari using its own Rig and expertise. The well reached Total Depth of 1820 meters on November 20, 2016. [79] Zarghun Gas Field project is unique in Pakistan petroleum history , as gas discovered is supplied to area locals only. Zarghun is estimated having gas reserves of 93 BCF . The laying of the pipeline from Zarghun to Quetta City by itself is a great achievement of Mari's human endurance and engineering marvel.

Hanna and Harnai

The Hanna Block, consisting of an area of 886.65 square kilometres is located in Balochistan province and lies in prospectivity Zone 1. (Pishin, Ziarat, Loralai, Quetta, Sibi and Kalat Districts).[80]MPCL is committed to a firm programme with a minimum financial commitment of US $1.30 million with one optional well upto a depth of 1000 meters or 100 meters into Dungan Formation, whichever is shallower. The Harnai Block consisting of an area of 2482.67 square kilometres is located in Baluchistan province and lies in prospectivity Zone 1. MGCL is committed to a firm programme of minimum financial commitment of US$ 6.175 million with a committed exploratory well upto depth of 1500 meters or 100 meters into Chiltan Formation whichever is shallower.

Ziarat Block- Bolan East-1 near Mach City in Kachhi District.

In 2005, Mari entered into its first ever operation outside Daharki with drilling of Ziarat Exploratory

[79] ttps://mpcl.com.pk/2016/12/29/commencement-of-production-from-development-well-zs-3-in-zarghun-south-gas-field-bolan-block/. https://fp.brecorder.com/2006/12/20061208505585/

[80] https://www.thenews.com.pk/archive/print/11875-mari-gas-wins-three-exploration-licences

Well No.1 MPCL is the operator of Ziarat Exploration License with 60% working interest, while PPL (Europe) is the joint venture partner with 40% working interest. The well was planned into the Chiltan Formation of Jurassic age.

EWT operations started on May 25, 2009. After producing 2285 bbls of crude oil, the well was shut down on June 15, 2009 for pressure build-up. Production logging was planned and executed after necessary approvals. The work-over operation was conducted with MPCL's own Rig Mari-1 and crew. The rig was mobilized on November 15, 2012. The work-over operation was completed successfully and function testing of the Jet Pump was conducted. The gross production of 1,000 barrels per day with 25 barrels per day Crude Oil and 975 barrels per day water was observed during the function testing. After the successful function testing of the Jet Pump, the Rig was released on January 02, 2013. With coordination and team effort, permanent surface production facilities were installed at the location. EWT operations at Khost-3 commenced on March 15, 2013. **On 22 May 2018**, Mari and its joint partner made a significant discovery at Macch in Kachhi District (part of Ziarat Block). Well was drilled down to 1,500 meters 'The drill stem tests carried out in Chiltan Formation, which showed a flow of 810 barrels per day (bpd) another drill stem test in Moro/Mughal Kot Formation tested 690 barrels per day of oil'. [81] It is highlighted that this is the first ever oil discovery in Chiltan and Moro/MughalKot Formations in Balochistan Province. [82]

Mari in Punjab

Punjab is Pakistan largest province in terms of population and second in terms of area; it is the cultural heart of not only Pakistan but also that of sub-continent. The province derives its name from the Persian; Panj (five) and Ab (water) meaning land of five rivers. Punjab covers an area of 205,344 square kilometres having a population of 110,012,442. Initially it were the cities of Taxila, Sialkot and Multan which marked the great seats of trade, government and learning. Lahore emerged at the dawn of last millennium and till to

81 The Tribune 15 September 2018. https://tribune.com.pk/story/1803665/2-balochistan-mari-petroleum-finds-significant-oil-deposits/

82 https://mpcl.com.pk/2018/09/27/hydrocarbon-discovery-exploratory-well-bolan-east-1-ziarat-block-balochistan/

date retains its importance as seat of culture and commerce; it is the capital of the province. [83]

Harappa archaeological ruins dates back to 4500 years and is one of the most important link in our human evolution. It was regarded as the very first city state of Aryans. Buddhist ruins at Taxila not far from Mari's headquarters in Islamabad are regarded as the oldest seat of learning in our history; they dates back to 500 B.C.[84]Tashkila was the most prosperous satrapy among the twenty odd satrapies paying tribute to Persia. Tashkila was paying in terms of gold whereas others were paying with silver and gold was fifteen times higher than silver; this highlights the richness of the city.[85]

Mode of transport for the nobility was horse and not one but four horses as riding on one horse was quite undistinguished in nature, elephants were the mode of transport for the king and the rajas, footwear was made of white leather with heavy soles to increase the height of the person, white dress made of cotton and wrapped around the lower and upper part with a head gear was the standard dress code, people tend to spend the hot summer day under the shade of trees with span so wide that ten people could sit under it.

Women and all the other population exhibited high virtues, Locals have been depicted as healthy mainly due to their simple diet and absentee from wine, the doctors specialized in every part of the body and disease, the nuisance and hazard of snakes and scorpions was manifold as they were found under every stone and caused painful bleeding from pores and ultimately death .Yet the local doctors with the help of the herbs were able to cure that ,another method of relieving the pain was through singing which was performed by natives. Men used to dye their beard in various colours like red ,green ,white and purple , men also wear jewelry especially earing made of ivory.[86]

Alexander the Great campaigns in Punjab are the earliest and most detailed military and cultural narrative not only of Punjab but also a great heritage of human beings. The Battle of Porus is a cultural heritage of Pakistan as the historian have nothing but praised for the character of Porus ' a man of character he was different from the Persian Darius who fled from the battlefield.. Porus's two sons died in the battle

[83] John Keay *India a History*, , (Grover Press, New York,2000,)
[84] Cambridge *Encyclopedia of South Asia* ,1982, pp,22-99. Jawaharlal Nehru *The Discovery of India* (John Day , New York,1945)
[85] Herodotus *The History,* translated by George Rawlinson,ed Manuel Komroff,(Tudor,NewYork,1928)
[86] Herodotus *Historia*

field….he looked majestic after the defeat in his over seven feet tall frame '[87]. Alexander's soldiers mutinied miles ahead of present day Lahore mainly due to high attrition and militant tribes. Alexander later during his retreat was wounded in the citadel of Multan.

Multan was the very first Muslim kingdom in sub-continent in 712 A.D, it was overrun by Mahmud Ghaznvi at the turn of last millennium, and soon along with Lahore these two cities became the pivot and seat of Muslim governess. In the succeeding years, Slave Dynasty followed by Moghuls retained the importance of these two centres. Multan was important as it controlled the southern routes of trade; Bolan and Baluchistan. Lahore like Multan was a province of ruling dynasties. Mughals built largest mosque in the world at Lahore apart from many breath-taking gardens including Shalimar .[88]

It was Maharaja Ranjit Singh who established the very first native empire in Punjab and brought all cities and towns under Lahore.[89] British too after annexation of Punjab in 1849, made Lahore as their capital and soon established some of the best colleges in the sub continent at Lahore including the present day Punjab University, Montsorie college , Aitcheson College, Mayo College, to name few. Apart from education institutions libraries, gardens, museums were also commissioned by the British. Lahore is also the seat of political movements, Pakistan resolution was passed in 1940 at Lahore. Punjab suffered the maximum during the partition of Subcontinent, when Punjab itself was divided on communal lines. The biggest tank battle after WWII was fought in Chawinda near Sailkot in 1965.

Punjab culturally is an agrarian society; however it is also the home of largest industrial areas and town including Faisalabad and Sialkot. The football used in 2018 World Cup was made in Sialkot so was the ball used in 1978 Football World Cup. Militarily it is the backbone of Pakistan's recruitment. Punjabi society is based more on caste than tribe, a person is known by the trade he is involved, like lohar (iron smith) gujjar (deals in milk and cattles) sonar (goldsmith) tarkhan (carpenter) teeli (deals in oil) julaha (weaver) jat (

[87] Arrian *The Campaigns of Alexander translated by Aubrey de Selincourt* (Penguin,1971),pp,200-280.
[88] Imperial Gazetteer of India, 1904.pp10-30.
[89] Cunigham Joseph Davey *History of the Sikhs*, (London: Oxford, 1918).

farmer) to name few. Intermarriages among castes is a rarity. Punjab also have the largest number of Christian population in Pakistan . In every Punjabi village, one is bound to see a shrine of some holy person, almost every major city and town have a saint patron, Data Gunj of Lahore, Baba Farid of Pakpattan, Bahauddin Zikriya of Multan, and Imam Barri of Islamabad are more famous. It is worth highlighting, that Punjab is also the home of Sikh religion, and as such some of the most holiest places in Sikh religion are in Punjab , including Panja Sahib at Hasan Abdal, Dera Baba Guru Nanak, Kartarpur in Sialkot and Samadhi of Ranjeet Singh at Lahore. Punjab is also termed as the granary of Pakistan and off sub-continent. Wheat, rice and cotton are main cash crops. The agricultural revolution was brought in late sixties when the Engro Fertlizer plant was commissioned in Ghotki Sindh. The fertilizer increased the average output yield of an acre from 15 maunds to present over forty maunds per acre. Punjab culture is thus a fusion of old and new, rich and poor, liberalism and fundamentalism, it is lively; music is an integral part of it. Within Punjabi culture women works in fields, are educated and plays a key role in any fight that erupts in village.

In terms of sedimentary basins, The Punjab Platform is separated from Upper Indus Basin by Sargodha High to the north and Mari Kandhkot High to the south and Sulaiman Foredeep to the west. Proven and potentially viable plays range in age from Infra-Cambrian to Eocene.[90]

Ghauri Block

Ghauri Block was granted to MPCL on February 16, 2010, covering an area of 1291.52 square kilometers, falling in Jhelum and Rawalpindi districts of the Punjab Province. The block was considered risky at that time due to presence of seven unsuccessful wells within the block; failure of these wells was presumed due to non-existence of mature source rock in the area. MPCL accepted the challenge and decided to take aggressive exploration activities in the area.

Based on in-house interpretation of 2D seismic data, first exploratory well Ghauri X-1 was spud-in on November 04, 2013 and target depth of 3,990 meters was achieved on March 01, 2014. The drilling and associated operations were completed in a record time of 117 days as against 235 planned days usually

[90] Ministry of Petroleum and Natural Resources *Opportunities in Pakistan's upstream Oil and Gas sector*

required for drilling a deep well in Northern region. MPCL made multiple finds at Exploration Well Ghauri X-1 while undertaking Drill Stem Test in Kussak Sand Stone and Sakesar Limestone. The well was successfully completed in Sakesar Limestone formation.

Production from well Ghauri X-1 was initially through natural flow, however a consistent and rapid decline in production was observed. Artificial lift system was installed at Ghauri X-1 in the form of Jet Pump targeting maximum recovery of in-place crude oil from Sakesar formation. Well was on regular production utilizing the hydraulic lift technology.

In April 2019, Mari and its joint venture partner PPL were able to discover oil at Dharain *the well was drilled in December 2017 and reached the depth of 4,770 metres with the objective of testing the hydrocarbon potential of Sakessar and Khewra formations as primary targets. The drill stem tests carried out in Khewra formation showed a flow of 372 barrels per day of crude oil*.[91]

Mari in Khyber Pakhtunkhwa

Khyber Pakhtunkhwa province a decade ago was known as North Western Frontier Province, a name given when it was separated from Punjab in 1901-02. Khyber Pakhtunkhwa (KPK) is also known as *Ghandhara Civilisation.* The province at present covers an area of over 101.741 square kilometres with a population of over 35,525,047. It stretches from Chitral in the north and follows the watershed of Hindu Kush down to the Waziristan in the south, with Afghanistan on its west, Balochistan in south and Punjab in east.[92] In May 2018, seven tribal areas which were previously under the federal control have been made part of the province through 26th Amendment In the Constitution of Pakistan.[93]

Traditionally the Pathan considers them to be one of the lost tribe of the Moses for the reason that it

[91] https://tribune.com.pk/story/1954865/2-mari-petroleum-finds-oil-reserves-rawalpindi/

[92] *Imperial Gazetteer of India Volume 1, Indian Empire Descriptive*. (Oxford: Clarendon,1907-1909) pp,360-370.

[93] http://www.radio.gov.pk/16-05-2019/enhancement-of-seats-for-merged-tribal-districts-to-pave-way-toward-qadri http://www.na.gov.pk/uploads/documents/1527169356_307.pdf. Constitution of Islamic Republic of Pakistan .

gives them a lineage to the Abraham religion rather than to be termed as anything else.[94] The Pathan tradition highlights that they are one of the early converts of Islam, Historically the early migrations from highlands took place along the water down streams , through the few passes including Khyber, Kurram and Tochi . The tribes either settled at the passes or move further eastward and settled in the fertile valleys and adopting agriculture as the way of life.[95] Pashtun society is thus based upon tribe way of life, among a dozen tribes only a handful are still migratory in nature including Afridi, Mohmand, Wazir, Mahsud, these tribes have different summer and winter abode. Other tribes like Khattak and Yousafzai have permanent settlements. Each tribe is divided into clans and sub clans. The migratory tribes controls the passes.

KPK was a seat of learning for the Buddhist religion, some of fierce battles against Alexander the Great were fought in Swat area. In modern time, neither Mughal, nor Sikhs or British had an easy control over the area. Forward Policy and Great Game made the passes strategically vital for the defence of sub continent.[96] In our time, Russian invasion of Afghanistan was an extension of the same policy and KPK played a vital and pivotal role in the war against Russia.[97]

9/11 had direct impact on KPK, as thousands of Taliban took refugee in the tribal areas, the resultant military actions by the western countries in Afghanistan further escalated the exodus and fermented a resistance movement against the occupational forces in Kabul. Pashtuns lives on both sides of the Pakistan-Afghanistan border (Durand Line). KPK thus suffered the maximum in this two decades of war on terror , both in terms of human lives and material wise. Pakistan Army in a surgical manner cleared the area from the terrorist and also won the heart and minds of the people. At present the province is now healing back into the normal way of life. Peshawar is the provincial capital and main city, other major cities include Kohat, Nowshehra, Mardan , Bannu, and Chitral. Presently KPK is a blend of conservatism and modernity, some of the finest educational institutions in the country are in Peshawar most notable being the Edwardes

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[94] Olaf Caroe, *Pathan 550 B.C.-1957 A.D.*(New York: McMillan1965),p-26

[95] George Curzon , 'Frontiers' The Romanes Lectures , 1907 delivered on 2nd November 1907, *Oxford Lectures on History ,1904-1923, Ten Volumes in One* . Library Press,1924.

[96] Algernon Durand. *Making of a Frontier, five years experience and adventure in Gilgit, Hunza, Nagar, Chitral and eastern Hindu Kush*. (London: John Murray,1899).

[97] Mohammad Yousaf and Mark Adkin *The Battle for Afghanistan ,the Soviets versus the Mujahedeen during the 1980s* (Yorkshire: Pen and Sword, 2007).

College and Islamia College (Peshawar University) along with Khyber Medical College. The biggest arms bazaar in the world was also located close to Peshawar having no less than 14000 shops dealing in arms and ammunition; majority of the arms being handmade. Pathan culture contrary to common perception is liberal, girls are educated, women have an important role within the domestic politics, it is highly courteous and full of manners; however the spontaneous and instant flaring up of tempers is also part of culture.

Karak Block

The Karak block was granted to MGCL, as operator and 100 per cent interest owner, on April 14, 2005. Subsequently MOL of Hungary acquired 40 per cent interest share in the block from the company. The block is located at the boundaries of Khyber Pakhtunkhwa and Punjab provinces between the districts of Karak and Mianwali. Crude oil discovery in Karak Block was made in the later part of 2011. To further appraise the potential of block, 3D Seismic survey was executed in 2013. Based on the processing and interpretation of 3D data, the location of two exploratory wells Halini Deep-1 and Kalbagh-1 were stacked on the ground.

Halini Deep Well -1

On May 17, 2014. Halini Deep Well -1 was drilled down to a depth of 5,900 meters. After conducting seven Drill Stem Tests in different zones, hydrocarbon discovery was made in Shinawari/ Samanasuk and Hangu /Lumshiwal formations. Installations of surface facilities including laying of 2.8 kilometre crude transportation line from Halini Deep-1 to well Halini X-1 and installation of discrete separation battery and storage facilities; were completed in a record time of 22 days. Oil production commenced on May 12, 2016 and the well was put on natural production.

Kalabagh

Kalabagh-1A was spudded in on March 20, 2015 in Karak Block with Rig Mari-1 to test the hydrocarbons potential of Sakessar, Lockhart, Hangu and Lumshiwal formations down to the depth of +2,750 meters . Subsequently, Mari decided to deepen the well down to 3,003 meter to evaluate the

hydrocarbons potential of Samanasuk and Datta Formations. During testing, the well flowed gas and condensate from Datta and Samanasuk formations, while the testing at Lockhart formation resulted in flow of crude oil. The construction and installation work for production and processing facilities was completed in March 2017. First gas supply started on June 14,2017. 5-6 MMSCFD gas from Kalabagh to SNGPL.

The Last Frontier; North Waziristan

North Waziristan remained the most turbulent tribal area for well over a century and only recently North Waziristan along with six other tribal areas have been brought under the administrative control of Khyber Pakhtunkhwa. Mari Petroleum Company, was awarded the exploration rights in the Block in 2016 when the situation in North Waziristan or in area Bannu West was precarious and uncertain. The Mari as a company believes in accepting the challenges, as its culture and character which has been developed over the last two decades, encourages bold step in exploration.

The classic oil exploration is synonym with frontier and hardship; the rewards are not only monetary but also shapes destinies of people and generations. North Waziristan covers an area of 6000 square miles with a population of one million; till 1895 the entire area west and south of Bannu was known as Waziristan, British divided it into two political agencies namely North Waziristan and South Waziristan. Geographically the area comprises of mountains, dry river beds, countless water streams known as Tungi. North Waziristan is in fact also known as Tochi Valley, The tribes living with in the valley are sub divided into clans and sub clans. From 2005, the North Waziristan became violent in every sense to an extent that road travelling for non-resident was a matter of life and death, Pakistan Army and the Tochi Scouts were deployed to bring the situation under control and resultantly in 2014 a major operation was launched in the valley to flushed out the miscreants; it was a successful operation. On the heel of this success, it was decided by the government of Pakistan to carry out exploration in the area for oil and gas.

Sindh, Home of Mari

Sindh[98] is the home of Mari Petroleum Company , as the main reserves of company (gas) are in this province.

The history of Sindh is infact the history of civilization in the Subcontinent, the ancient ruins at Mohen jo Dharo highlights the rich cultural heritage of Sindh. the province derives its name from the River Indus.[99] *4500 years ago human development reached a striking peak in the Indus Valley cities of Harappa and Mohen jo Dharo.*[100] The Indus valley is 950 miles long and 700 miles wide, its slope is steep 1:7,000 nearly double of the Egyptian civilization . Apart from Mohen Jo Dharo there are ancient ruins at Kot Diji known as the Chando Darro[101], Alexander The Great during his retreat along the River Indus faced stiff resistance, he camped for weeks at present day Thatta.[102]

Sindh was known as Hind by the Persians,[103] the province takes its name from the River Sindh, the province is also known as Mehran Valley. Sindh is geographically, culturally and ethnically divided into two halves, Upper Sindh which is home to the Sukkur, Khairpur , Larkana (Mohen Jo Dharo) is agriculture based whereas the Lower Sindh including Hyderabad, Thatta and Karachi are commercial centres. Sindh is also known as gateway of Islam to sub continent, as the very first Islamic invasion took place in this province.

British annexed Sindh in 1842,[104] it was a frustrating act on part of the British , after humiliating defeat at Kabul . British East India Company had adopted the land route from Sukkur-Sibi-Bolan to enter into Baluchistan thus in order to safeguard the strategic route the Sindh was made part of the Bombay Province

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98 http://www.na.gov.pk/uploads/documents/1550130216_490.pdf. Under the 1973 Constitution the proper name is Sindh and not Sind, as it was used in past

99 Herodotus *The Historia*, translated by George Rawlinson, ed Manuel Komroff, (NewYork: Tudor, 1928), p.182.

100 Cambridge *Encyclopedia of South Asia* ,1982, p-9. John Keay *India a History*, , (New York: Grover Press, ,2000) p.32.

101 Ibid p-452-458

102 Arrian *The Campaigns of Alexander* translated by Aubrey de Selincourt (Penguin,1971),p-280

103 http://www.nihcr.edu.pk/

104 Imperial Gazetteer of India, 1904

and remained so till 1935 when it was accorded the position of a separate entity.[105] Under the British rule Sindh flourished and entered into modernity, very first police force in sub-continent was raised in 1866 in Sindh. Karachi emerged as main sea port and later the very first aerodrome were constructed at Drigh Road, and Mauripur. It is worth highlighting that Colonel T.E. Lawrence ' Lawrence of Arabia' served as an airman at Drigh Road base for well over three years. Karachi by 1920s emerged as main link in the trans-continental airways.[106] Sindh also have the distinction of being the very first province to vote for Pakistan in 1947, [107]after independence it became the capital of Pakistan and remained so till 1960 when it was shifted to Islamabad. Karachi is the provincial capital and also the commercial capital of Pakistan , at present it boasts a population of over 20 million people having diversified ethnic background. In post 1947, an influx of refugees from India settled in Karachi and that created a linguistic and cultural stress with the locals. Karachi flourished and expanded in every sense and in every direction, some of the finest hotels were built and operated, including Metropole, Beach luxury, Hyatt, Sheraton, Hilton, Holiday Inn to name few. The variation in culture between the locals and the refugees often resulted in violent expressions from both parties and this stalled the progress of Karachi and the province to a great extent before it was finally arrested in 2015. Mari and its predecessor ESSO both had headquarters at Karachi. Exploration in Sindh started in 1893 at Sukkur. [108]Sindh culturally is sufi oriented, land is owned hereditary, the society is tribal based ; overall a very serene and mild lifestyle. Apart from the overwhelmingly Muslim population there is a high number of Hindus (largest number of Hindus in Pakistan lives in Sindh) Parsis and Christians. Sindh is also the heart of Pakistan's fertilizer industry, two of Pakistan's biggest natural gas fields in District Ghotki(Qadirpur and Mari). Pakistan's biggest fertilizer plant Engro and another plant of equal magnitude Fauji Fertilizer are also operating in this district.

Sindh province has two major Oil and Gas bearing regions, Sindh Monocline commonly known as Badin Block Area and Outside Sindh Monocline which includes Sukkur Rift Zone, Mazarani Fold Zone, Khirthar

105 Government of India Act 1935.

106 https://sindh.gov.pk/dpt/History%20of%20Sindh/history.htm

107 Fatima Riffat, Iqbal Chawla, Adnan Tariq *History of Sindh from a regional perspective, Sindh and Making of Pakistan* . (Lahore:Punjab University,2016),160.

108 https://www.dawn.com/news/1479814/a-brief-history-of-exploration

Depression and Karachi Depression. Districts including Badin, Tando Muhammed Khan, Hyderabad, Tando Allahyar and Thatta are also part of Badin Block Area.

Sujawal Block

The Sujawal Block consisting of 2,416.43 square kilometers is located in Sind province and lies in prospectivity Zone III. MPCL is committed to a firm work programme of minimum financial commitment of US $ 6.15 million with a committed exploratory well of approximately 3000 meters. The Sujawal Block was awarded to the company as operator with 100 per cent working interest in June 2006. The company drilled its first exploration well, Sujawal X-1, in 2010, which led to a gas and condensate discovery. The discovery has since been brought on stream supplying gas to the Sui Southern Gas Company and condensate to the Pakistan Refinery and Pak-Arab Refinery. Gas discovered is of a good heating value of 1045 BTU per cubic feet. The work on Sujjal-1 well, the second exploratory well in Sujawal Block, was taken up on 26th January 2014 and drilled down to a depth of 2535meters in Lower Goru Formation. As a result of testing, the well flowed gas and condensate at a rate of 13.1 MMCFD (million cubic feet per day) and 75 barrels per day (BPD), 'We have been blessed with a significant gas and condensate discovery in Sujawal Block's Sujjal-1 well,'.[109] This discovery is significant because it is the first hydrocarbon discovery in Lower Goru Upper C-Sand in the southernmost part of the country

Aqeeq-1 exploratory well was spud-in on March 9, 2017 and drilled down to 2,320M to test hydrocarbon potential of the Upper Sands of Lower Goru Formation. During testing in Upper Sands, the well flowed 5 MMSCFD gas and 21 barrels per day condensate with wellhead flowing pressure of 586 Psi at 40/64 inch choke size and preparations were carried out to bring the well on production.

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109 *Dawn* 13th May 2014

Rigs of Mari

The drilling rigs are the working bulls of the E&P industry, the drilling rigs are the very essence and soul of oil exploration, ranging from towering massive structures to smaller ones; these structures drilled deep into the earth crust and recovers valuable hydrocarbons. Mari inherited 'Sky Top Rig' from ESSO in 1984, the rig was bought in the late fifties.

Rig operators lead a rigorous life, working at the drilling site round the clock. Rigs move extensively and operate as a single unit and entity; where everyone precisely knows his task and duty. There is no proper institute for training Rig operators in Pakistan and majority of experienced operators working at Mari today have gotten their prior experience while working in the Gulf. With the induction of two new rigs, it was necessary for MPCL to have experienced and professional crews to operate these rigs.

At the drilling site, a well established camp is setup in which the working, living and drilling areas are clearly marked and outlined. The supervision of the drilling rig is the responsibility of the Tool Pusher, an operator who wears a blue uniform, and ensures the safe and smooth conduct of the drilling rig. The Company Man wears a khaki uniform and is responsible for everything else apart from the work of the Tool Pusher. Apart from these two men, a representative of HSE is also present on site to ensure that all safety parameters and requirement are strictly adhered to. In order to deal with medical emergencies the presence of a doctor and ambulance is also available on site.

Contrary to popular perception, only a handful men are required to operate a rig, as they work in shifts approximately thirty odd men are sufficient for operating a rig around the clock. Work starts with the dismantling of the rig from one point and its transportation to another; Mari Rig 3, requires a truck load of approximately 90 units for transportation. This phase is accomplished with precision and requires experience.

The exploration and drilling of hydrocarbons involves studying the structure of the earths crust. To spud a well requires months of meticulous hard work and planning. The present theories on hydrocarbons

revolves around the hypothesis that, first and foremost a source rock has to be identified in which the fossils have been buried over the centuries and millenniums known as Palaeozoic Era; this source rock should be buried deep enough to allow the earth temperature and pressure to heat the fossils. Next to the source rock, porous rock formations having good permeability must be present so that it allows for a free flow of hydrocarbons; a Cap Rock is also essential as it seals or traps the hydrocarbons thus capping them inside the crust. In Mari, all this work is done by the Exploration Department.

The next step is to analyse the geologists' hypothesis by carrying out seismic survey, thereby probing deep into the suspected rock area. There are methods including Vibrosis, in which the vibrations are created and then their effects are analysed. Dynamite is another method in which the dynamite is use deep inside the crust to create ripples and then analyse it. Mari Services Department was raised in 2014 to carry out all such ventures at its own, thus bringing flexibility and economy to the company. In many of the annual board meetings it was highlighted that due to non-availability of such services the company has suffered losses, basing upon this, the MSD was raised. After the completion of this phase, the decision to conduct the physical drilling to validate the hypothesis is reached. Once, it has been decided drilling will be done, the intricate business of moving the rigs and other equipment is set into motion.

Acquisition of land is another delicate matter in which more than anything the social culture plays a key role. As long as Mari was operating in the Daharki, the acquisition was streamlined due to the continuous presence and drilling activities of Mari Gas Company Limited and its predecessor ESSO. In the Mari Gas Field, initially an acquisition of eight acres was made for each well which has now been reduced to five acres. The owner is given a compensation for his land which is much higher than the market price and more importantly he is paid to protect the well as well. This system known as Chowkidar (watchman) is hereditary in nature, In Punjab, acquisition of land requires a more patient approach and the director lands (DM Lands) is required to undertake many sojourns and attends lengthy meetings not only with the owner but with his entire extended family at their residences. As soon as the general public realise that sooner or later an exploration will be conducted, they get into litigation amongst each other so that they can fetch the highest possible price for their land. Before any deal is reached the land records have to be verified and looked into.

This process is long and tedious but is resolved in an amicable and peaceful manner.

Establishing of the well and camp from scratch, requires clearing the area, it is cleared for establishing the basic essential amenities. One of the fundamental area that are taken into consideration involves safety as the first and paramount factor. The very nature of the well, whether it is wildcat, appraisal, exploratory or deep plays significant role in the overall development of the well.

Before the rig is moved, the administrative and safety parameters must be met. A camp with a rig is a high end camp, having its own doctor, ambulance, geologist, water supply, power, road, communication and now internet access. The living and catering is on contract. In the past it was in canvas, at present it is in air conditioned containers with attached washrooms. Two types of messes are established in the camp, one for seniors and another for juniors, there is no difference as far as the menu is concerned, it is only to allow greater freedom of relaxation to the juniors. Discipline in a camp is very rigorous and very rightly so as the job itself is highly inflammable and a minor lapse of concentration can have disastrous consequences results.

The drilling site is divided into two sections, one under the supervision of the Company Man and the other under the supervision of the Tool Pusher, with a representative of health-safety-environment (HSE). All the work especially the initial setting up and later day to day operations are monitored by HSE. Safety overlook isn't an integral part of our day to day life or culture in Pakistan, thus ensuring that everyone is wearing protective gear, identification of health hazards and ensuring that the highest safety standards are adhered is difficult and tedious task . At present, all fields are monitored in the head office through cameras for safety parameters.

Mari purchased its first Rig in 2007 when it signed a contract with Honghua Petroleum Equipment Company at their headquarters at Chengdu. It was delivered in Pakistan in March 2008. It is a 1500 horsepower rig which can drill down to 5000 meters. Another Rig Mari II was purchased and inducted in 2013, it was bought from same company but has more horsepower and can drill deeper than the two other rigs.

Chapter VI

Mari Culture

Safety , Social Responsibility and funfair

Culture of an oil and gas company is nurtured and mature through hardship of exploration in field. Mari took birth in 1957 as Pak-Stanvac and remained so till 1984 when it reincarnated itself into Mari Gas Company Limited. The era of Pak-Stanvac had an American way of working culture, informal, less bureaucratic, open minded but professional. Americans being unaware of local history thus had the advantage of being free from prejudices of sub-continental narrative. With the passage of time the local and foreigners became best of the friends, they celebrated each other's holidays and national milestones.

Mari Petroleum Company is a classic blend of military and civil working culture. As the managing director is a retired three star general from army thus he brings in a vast and rich panorama of economic, social and political situation in the country; which he has accumulated over three decades of military profession. Mari's culture thus evolved around their personality and the personality of these generals owe much to the regiments and arms they were commissioned; with one odd exception all have been commissioned in infantry regiments.

Mari as a company is based upon economy in which the capital of the shareholders has to be protected, and this requires working and thinking in a flexible, open manner. Gas reserves especially in Daharki are the most precious assets of the company and they have to be monitored so that, they last for long and in the meanwhile explore new vistas to safeguard shareholders capital.

Mari Petroleum Company is a conservative, forward looking, open merit, beyond class, creed or religion commercial company which makes all efforts to afford job satisfaction to its workers. Company is organised into two main tiers, management and non-management cadre; along with a substantial workforce on

contract. The present strength of the Mari Petroleum Company is 1370. Oil and Gas is an exciting fieldwork, which offers one of the best pay package in Pakistan. Apart from the monetary benefits, Mari offers a bright, peaceful, rewarding and exciting life and work pattern. There are second generation men in the company now, both in management and non-management area.

International days like Women Day, Special Person Day are also celebrated in letter and spirit. Mari takes pride in being one of the most forward looking company in the country which affords equal opportunities to women and persons with disabilities. Mari Women Association was established in winter 1993, it was brainchild of Begum Hamid Niaz, 'to provide an informal forum to coordinate individual and collective efforts in social welfare'. The MWA having been holding and organising family get together on regular basis. Some of the pioneer notable ladies include Dr Shahnaz Attaullah who served as lady medical officer at Daharki, Mrs Anisa Ghulamali she served as executive secretary to general manager at Karachi , Mrs Janet D Souza , she was confidential secretary to financial manager, Mrs Thelma Peters she performed the duties of stenographer at audit office Karachi and Mrs Julia Shafique a staff nurse at Daharki .

Healthy safe environment is a prerequisite for any oil and gas company to survive; hydrocarbons are an extremely dangerous field and can take its toll if not handled properly. The first and foremost is the threat and fear of fire, due to high inflammable substance it can occur any time at any place due to a minor lapse of safety. International Safety Organisations (ISO) have set its own standards in this field, Mari complies with the latest such standards by having its manpower being trained in this and also applying it across the fields with a uniform character. At present all offices, schools , clinics, living area, and wells comply with the latest standards of safety. A safe workplace is a healthy workplace in every sense of word, thus it is applied wholeheartedly, culturally the people consider it as a sign of weak masculinity in following and adhering to the safe practices like wearing of seat belts during driving. With years of persistence involving punishment and rewards, a level has been achieved where a four year old child in Daharki also puts on the seatbelt and this has helped a lot in inculcating the safety culture among all. Schools are thus the basic brick where children are taught and shown the benefits of having safe practices in every day life. There are hand washing days, road crossing days and so on. As an institution , violators are given tickets for violating any of the

safety parameters like speed limit and traffic sign violation within the colony at Daharki. At rig sites, safety clothing, eye wears, shoes are provided and none is allowed to work without wearing the required dress. As all the rigs are now monitored through cameras thus any worker doing any work without wearing gloves in Zarghun or Daharki is observed by the head office at Islamabad and prompt call is made.

Mari Gas Company Limited (MGCL) has achieved three international standard certifications for its Integrated Management System (IMS) comprising of ISO Quality Management System (9 0 0 1:20 0 0), ISO Environmental Management System (14001:2004) and Occupational Health and Safety Management System OHSAS (1 8001:1 999). These certificates have been issued by SGS Pakistan Limited under authority by SGS United Kingdom Limited Systems and Services Certification Division headed by SGS Societe Generate de Surveillance Switzerland. MGCL is the first E&P Company in Pakistan to achieve these certifications simultaneously. The certificates were handed over at a simple but impressive ceremony held on Thursday, July 19,2007.

At the site all scaffolding and other infrastructure is inspected through third party inspection, all workers are certified. On arrival at any of the Mari site, a visitor is first briefed about the HSE policy and is given a short but comprehensive education regarding the policies, muster point in case of fire and has to wear the safety dress if he wishes to cross the line. On every site there is a thin line, beyond which none can cross without proper attire. For a newcomer or a guest, the life pattern at Mari is something beyond his or her comprehension, there is a first aid kit in every room, fire extinguishers in dining halls, public places and rooms, muster points which are the rally points to gather in case of a fire or an emergency. Strict speed limits within colony are some of the acts which ensure safe day for everyone.

Number of incidents have reduced considerably since 2012, despite the fact that that thee has been three fold increase in workforce, man –hours.

Mari's Social Responsibility

Since the discovery of Mari Gas Field and its active development, Mari Petroleum Company Limited,

and its predecessor company Esso Eastern Incorporation, have been involved in activities to enhance local welfare. Initially it wasn't a regulated affair, ESSO after its plant at Daharki was commissioned had certain facilities like hospital for its staff and these were also extended to the local population. Majority of the people in this area live on meagre incomes, with goat and cattle herding as the chief source of livelihood, as such can ill afford to pay the ever increasing costs of medical facilities. The demographic layout of the Daharki is by and large rural, economically poor, uneducated, large family structure, poor hygiene, crumbling communication infrastructure; alongwith severe summer and lack of fresh drinking water. Despite all these social handicaps the area is peaceful, lively, hospitable and strongly knit basing upon kin and tribal affiliation. Weapons are rare so is kidnaping or theft.

The petroleum policy of Pakistan binds oil and gas companies to carryout welfare works including development of roads, water supply, health, educational facilities, eradication of illiteracy , rehabilitation of mentally retarded and handicap children, promotion of sports and to fight against narcotics.

As Mari was the sole gas field and Tehsil Daharki was the only administrative unit in which Mari was operating till 2005 thus bulk of its CSR activities took place in this area. At present, in almost all blocks in which Mari is operating, a school, a dispensary is a self mandatory responsibility alongwith water works and communication infrastructure. Exploration is invariably carried out in the far flung areas, population in such remote areas are far from the basic health facilities; thus providing medical treatment to them takes priority as social responsibility. After Mari Gas Company was raised, realizing the urgent need, Mari launched its project of Mobile Dispensary in 1986. A qualified and dedicated doctor, along with his paramedical staff started visiting specified locations three times a week. The treatment and medicines were given to the patients without any charge. The project proved to be a welcome relief for the people and received very enthusiastic response. The number of patients treated increased from 25000 in 1987 to about 55000 in 1993.

Mari is now, operating two mobile dispensaries each carrying a team of one qualified doctor and paramedics. The treatment and medicines are still provided free of cost. The number of visits in the field have also been increased form 3 to 4 days a week. A sixteen bed clinic has been commissioned at Daharki

which is virtually a base hospital covering medical, surgical, pathological, adjunct diagnostic and radiology fields. In addition gynaecological and obstetrics facilities with delivery room and labour rooms have been catered for. With the provision of latest medical equipment, Mari's hospital provides excellent health cover both indoor and outdoor. Computerized card system has been introduced for patients in order to maintain medical history. The building is centrally air conditioned.

Mari's War on Tuberculosis and Hepatitis

Tuberculosis (TB) is an infectious disease affecting the lungs of the patients. In Pakistan roughly 430,000 people including 15,000 children are affected with TB and no less than 70,000 lost their lives annually. Mari have undertaken a Tuberculosis Treatment Programme, ten cases of tuberculosis are selected each year and the patients are provided fully monitored treatment with most modern drugs and other methods. The rate of success has been tremendous. Over a hundred patients have so far been fully cured under this programme and are leading normal lives.

According to an estimate there are 400 million Hepatitis-B carriers around the world and two million people die every year because of this disease. Pakistan is among the most affected countries. The cost of treatment of this disease is beyond the reach of poor people therefore the Mari decided to vaccinate the general public of the Mari leased area. Initially a rough figure of population was gathered from Union and Tehsil Council but this was not categorized in age bracket which is a prerequisite for establishing the dosage to be injected to each category. It was therefore decided to carryout a census by our own staff in order to arrive at the exact number of children and adult population residing within the Union Council. The thickly populated village of Dad Laghari, where majority of the Mari's wells are located, was selected as a starting point for the campaign. Through the dedicated work of Mari's medical staff and full co-operation of the local population, the vaccination in the leased area well was completed in four phases. More over casual working staff of Mari gas field and their families were also vaccinated. A total of 140,401 persons were screened, out of them 134,192 were found negative and vaccinated. 6,209 persons were found positive of Hepatitis-B infection.

Present- 2019

At present, the three major core areas, health, education and communication all have matured in the Mari gas field area. At Dad Laghari health unit for female patients, lady doctor daily along with her nurse travels from Daharki covering half an hour journey and provides medical respite to daily over two hundred patients. Ulltra sound facilities are available in all the three clinics in Mari area, so is dental, tuberculosis, chest, X-ray, and blood sampling. Ultra sound is handled with care and confidentiality, the social pattern of the area is such that families prefer male and are generally dismayed if they lack male heir or have number of daughters. Maris's doctors fully understand the local culture thus at times they do not share the result with patients due to fear of negative implication for the patient herself.

As Doctor Shabana highlights '*lack of iron among women is the major source of diseases….personal hygiene due to lack of water also adds misery to the patient…there is utter lack of education among male regarding the women psychology during pregnancy.*' Thus Mari's medical staff not only provides medical relief but also educate the patient and it is paying back with an increase awareness in the area.

Doctor Channa, who is looking after the tuberculosis and chest related issues in the clinic, highlighted that majority of patients have mental issues more than actual medical problems, they feel an uplift mentally if they are given heavy quantity of medicines. ' *We educate them that taking more medicines than required is harmful and can have long lasting effects'*. Now after years , the locals having learnt it hard way now pays more attention to what the doctor is recommending. Patients comes from far flung areas, travelling hours and hours , because the healing powers of the Maris doctors travel fast and far.

Mari Grammar School.

Till 1993-4, children of Mari's employees at Daharki were attending the school within Engro complex. The idea of having Mari's own school of a very high standard was conceived, perfected and implemented by Managing Director Lieutenant General Hamid Niaz (Retired) . An aesthetically designed and well planned school building, covering an area of about 22,000 square feet and consisting of all the required amenities

was constructed within the residential colony area . Class rooms, tutorial rooms and playing area have been appropriately furnished and equipped. About sixty excited and exuberant children joined the inaugral classes JI to V during the academic session 1995/96. Prior to opening of own school, the children of management staff were enrolled at Engro's Grammar School, where the medium of instruction was English. The children of non-management staff were attending Employee's School with Urdu/Sindhi as a medium of instruction. As a major step towards merit and equal opportunities, all these children now studied together and enjoys the same facilities. Since the medium of instructions at new school was in English, thus special coaching classes and tutorial groups, in English language, were conducted in order to strengthen the base of all those children who required such help. Two qualified and experienced teachers Mrs Anjum Alam and Mrs Huma Latif made an all out efforts in this regard.

Mari Grammar School has come a long way. At present, it can be rated as one of the finest school in the country, teachers are hired from all over the country and are provided free accommodation and a good pay package. The best part of this school is the sports facilities it provides to the students, specially the girls, who now plays cricket and other games at competitive level. School and its principal both plays a key role in the overall mental grooming of the young generation. National days are celebrated with much zeal and fervour, there are educational and recreational trips for the students. Arts and science fair are held regularly.

Mari Special School

Children are the most precious bounties of Allah Almighty. They are the ones on whom our dreams and hopes are pinned. Special children are even more special for us. It is in this perspective that a special education school for rehabilitation of handicapped children has been established which was inaugurated on October 7, 2009. It is aimed at the mental development of the retarded children with emphasis on education and training to make them useful members of the society. At present, ten students have been registered and given admission in the school. An experienced teacher has been hired and services of a speech therapist are also being hired to improve the speech and language deficiency of children. Children are taught computers and are given regular music lessons as well.

The Citizen Foundation (TCF) is a charity organisation which works to spread education among the poor and in remote areas. Mari joins hands with it and built a state of art school , close to its headquarters at Daharki. Free transport is being provided to the teachers and other staff, the entire building is air conditioned. Similar schools are also being operated in Zarghun in Balochistan.

Apart from these schools , Mari in 2012 also established a Chair in Quaid-E-Azam University , Islamabad for Geology. Mari also signed a memorandum with Government of Balochistan for the improvement in education in province. Regular stipends are also given to the deserving children.

Natural Calamity

Floods are quite a regular event in the Sindh and Punjab, whereas earthquakes are rather rare in our country. However, if taken off guard both can play havoc with human lives. In 2005, Pakistan was struck with one of its deadliest earthquake in modern history. Northern Areas were the worst affected; Mari contributed in terms of medicines and food items.

The last major floods in Sindh occurred due to the unprecedented heavy downpours during September 2011. Resultantly, standing crops were destroyed and the property was also badly damaged leaving the people shelter less and without food. The stagnant water added further miseries to the locals owing to the breeding of mosquitoes in abundance. In view of the deteriorating conditions of people dwelling in the lease area , four camps were established in Union Council Raharki, Dad Leghari and Beruta. While selecting the location of camps, it was ensured that these were centrally located, covered almost entire Field benefiting the majority community. The tent villages contained all basic amenities including:Canvas shelters.clean drinking water storage, cooked food, mosquito nets alongwith anti mosquito fogging spray, latrines, electricity through generators and a mobile dispensary. Later this became a standard pattern to be deployed in any calamity.

About 500 families were provided with the above mentioned facilities in the camps for six weeks. During relief operations, around 10,000 patients suffering from dysentery, malaria, fever, skin and other

water borne diseases were treated through Mari Mobile Dispensaries. As a long term plan, over two kilometres bunds were constructed by using sand bags to protect main villages.

Internal Displaced Persons

The crises (2007-2014) due to military operation in Swat, Buner, Orakzai, Mohmand and Lower Dir districts resulted in large number of Internally Displaced Persons (IDPs). The scale of suffering was immense. There was a pressing need of basic items such as food, water, shelter and medicines for the IDPs in the camps organized by government, NGOs and UN relief organizations. Mari management decided to assist the IDPs by donating relief goods worth Rupees. two million; employees also contributed in this noble cause by donating one day's salary.

Sports

Sports is special for Mari, because company feels that through sports everything can be achieved; health, motivation, happiness and a feeling of being good. Cricket is more popular in Pakistan, followed by football, hockey and volleyball. Tennis and Squash are other two sports , especially Squash is almost synonym with Pakistan, as country has ruled international courts for well over two decades. Badminton and table tennis despite their being economical and taking less space has yet to reach the level of popularity in country as desired. Mari thus endeavours to promote sports in every which way possible, it enrols sportsmen, encourages sports and compete in all national games and sports competitions by entering own teams. Presently, Hockey is now being given special attention mainly due to the fact that despite being an Olympic gold medallists in past , Pakistan is now at the bottom of hockey rankings. Mari sports teams plays and compete at national level, in Islamabad the training camp is conducted at the most modern Islamabad Sports Complex. Apart from these national level competitions, regular matches are played on inter departmental basis; aim is to promote the sports and through this encourage future generation to adopt the principles of sportsman ship.

Miss Sarah Mehboob, Pakistan Women Tennis No. 1 player was sponsored by Mari Gas Company to

participate in two International Tennis Federation (ITF) world junior championship events held in United Arab Emirates (UAE) from 16 - 31 January 2009.

Art and Culture

Pakistan has a rich canvass of art and culture and Mari Petroleum Company is playing an important role in its preservation, promotion and patronage. There are over sixty oil paintings hanging on the walls of the main offices which were commissioned since last ten years by local artists depicting Islamic calligraphic and cultural life. On annual functions, local artists are invited to perform. In 2017, Mari sponsored an expedition to Mintaka Pass in Gilgit region to create an awareness among the people regarding the history and geography of own country. With passage of time, as Mari establishes itself into the four provinces of the Pakistan, the scope of corporate social responsibility has become manifold , not only to help the living but also to highlight the very soul of the country through its art and culture. Good journals and magazines that are above political affiliation and are more focused on the art and culture are supported through advertisement.

In March 2019, Mari sponsored Mr Ghauri, a renowned photographer to have an exhibition on Pakistan's culture at Rawalpindi Arts Council.

Mari Annual Function

Mari's annual function is the high point of the social calendar, an evening to relax and enjoy. Awards are given to the high performers to encourage them and the others. The function itself was initially held in Daharki for long and it was only after commissioning of new office blocks in Islamabad that it was shifted here; even now it is alternatively held at Daharki.

The first grand annual function was held on 1st December 1994 at Daharki, there were festivities all around. Athletics competition for the school children, military band of Sind Regiment was also present. Cricket match between the management and non management was also played. Abdul Wahab led the

management team whereas Mr Soomro captained the non management team. Apart from cricket, a tennis tournament was also held for the annual function in which teams from Karachi and Islamabad apart from host Daharki took part. Divisional invitational shooting ball tournament was also organised for the function, sixteen teams took part in it, final was played between Mari and Qazi Club of Khairpur; which the latter won .It is worth highlighting that Mr Abdul Fateh of Mari was adjudged man of the tournament.[110]Another interesting feature of the annual function was the Mari Ladies Club gathering , it provided opportunity to ladies from Karachi, Islamabad and Daharki to interact with each other. *Shazia and Asifa daughters of Mrs Waheed and Mrs Marshall respectively, used 85 eggs in making chocolate cake*. As part of the annual function, guests were taken to Well No.45, picnic area was nicely decorated and the charpoys covered with multi coloured bed sheets really depicted local culture. I*t was really exciting for the children to see the dancing camels and acrobating monkeys. Most fascinating was the snake charmers show who showed a fight between a Cobra and Mongoose'*. A grand dinner was also hosted attended by commissioner and deputy commissioner of the district. Highlight of the evening was the long service awards, Mr Muhammad Wajid Ali was the longest serving employee , he had joined the company on 1st August 1956, he was awarded with 35 years service award. Mr M.I.U. Qureishi had joined the company in 1969 as gas field operator, Mr Wahid Bux Pathan had also joined in the same year as typist, so was Mr Muhammad Sadiq. In the fifteen years service category. Mr Jamshed Iqbal and Mr Liaqat Ali Khan both from management were awarded. Major retired K.Cardoza who had joined the company in 1979 as warehouse supervisor and served the Mari as administrative officer and employee relations officer was also among the recipients of award.

In 2012, the tradition was revived after a long break and since then it is held regularly. In 2018, then prime minister of Pakistan Mr Khaqan Abbasi was the chief guest. Apart from the annual get together, Mari also have an annual Iftaar cum dinner gathering. Mari also celebrates official holidays like birthday of Father of Nation, Poet of Nation day, Eid Milad Nabi, Pakistan Day, Independence Day, Defence of Pakistan Day; to name few.

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110 Mari News, July-December 1994.

Head office Mari

The Mari commenced its operations back in 1954 as Pak-Stanvac Petroleum Project. Stanvac was headquartered in New York USA with local office based in Karachi for managing the operations. Karachi till 1959 remained as capital of Pakistan. The initial office location at Karachi was Finlay House, Mcleod Road (Currently I.I. Chundrigar Road), Karachi. Towards the twilight of 1960s, the office was shifted to the Dawood Centre, New Queens Road (Currently Maulvi Tameezuddin Khan Road), Karachi. In 1974, The office was shifted to 8th Floor, National Shipping Corporation (NSC) Building (Currently PNSC Building), Maulvi Tameezuddin Khan Road, Karachi. In 1984 when Mari Gas Company Limited was raised, the importance of having an office at Islamabad became paramount as the Fauji Foundation was based at Rawalpindi along with petroleum ministry and other related government departments and ministries. In 1985, the Mari's head office was registered at a Bungalow in Nazimuddin Road, Islamabad, however, it only housed the MD secretariat then while the rest of the operations continued from Karachi Office which had now been established in C-9/2, Block 9, Kehkashan, Clifton, Karachi. During the early 1990s, the gradual shifting of the functions of head office from Karachi to Islamabad had started.

It was Major General (retired) Mehmood Aslam Hayat the very first managing director idea to have a head office for the company in Islamabad and during his tenure , plot No. 21, in G-10 Mauve Area Islamabad was purchased. Construction of building was initiated in August 1994 when the ground breaking ceremony was performed by the then Chief Executive of MGCL Lieutenant General. Hamid Niaz (Retired) on 16th August 1994. MGCL The design of the building was prepared by M/S Engineering Project Consultants-Islamabad, and the Civil Construction job being undertaken by M/S Expertise Islamabad. Design envisioned a six storied building, providing about 40,000 square feet of covered area. Thus only half of the purchased plot's area was utilized.

In 1996 the construction of head office Islamabad was at its last stage. But still all important departments (Finance, Operation, Procurement etc.) were in Karachi Office.

'The responsibility of completion of Head Office was on me and Colonel(retired) Amjad. Lieutenant General(retired) G.M Malik now MD also instructed that he will be sitting in his new office on 22 December 1996. We were given seven month to complete the task, whereas the civil work was still under progress. The interior, air conditioning units and furnishing was also pending. For this a lot of hard work and efficiency was required. I requested MD for an extension but he simply refused. On the other hand, he kept on boosting up our morale and encouraged us to complete the project in given time. As we near the deadline and work was also on time, We jumbled up with another complex situation when we came to know that the furniture ordered by us has left for head office. It should have been something to be happy about that we were getting the delivery on time but the problem was the lifts of the building were not installed by then. Finally the truck loads of furniture arrived, Colonel(retired) Amjad was very confident and took me to Golra Mor, which was taken by Afghan Refugees at that time. He selected 15 Afghan men from there and instructed them to reach the head office. These amazing, hard working men carried the furniture and placed everything on different floors as decided. By 2 am of 22 December 1996 everything was well settled and in place. It will be not wrong if we say when there is a will there is a way. The staff of Islamabad Head Office was all set to welcome with excitement and happiness on their faces. Everyone was delighted on the completion of head office building. As expected Lieutenant General (retired) G.M.Malik's vehicle reached the gate on 23rd December 1996 at 08:30.'

New Office Building

By 2009, it was felt that present location and space requires upgradation, moreover the security environments were such that travelling for own employees in Mari's transport from different part of twin cities was a security hazard Defense Housing Society Phase-2 in Islamabad was selected and proposed as an alternate place to construct a new office structure. However, the idea was not approved in the board of governors meetings and resultantly it was decided and agreed that new office should be constructed on the adjacent plot ; already property of Mari. It goes to the credit of Lieutenant General(retired) Raza Muhammad Khan who took over as managing director in February 2011, that he not only got the suggestion approved but also within a span of fourteen months was able to design, construct and commission the new

building through reputed firms. Colonel Shah Rukh (retired) played a key and pivotal role in this project. Initially the design was for four floors and later the basement was incorporated. The building itself on its completion was a state of art structure with main focus on environment and security.

Karachi

In 1994, it was principally decided by the MD Lieutenant General (retired) Hamid Niaz to have a Resident Office of Mari's own in Karachi rather than working from a rented premises. It was finally completed and inaugurated in December 1997(D-87, Block 4, Kehkashan, Clifton) by Lieutenant General (retired). Ghulam Muhammad Malik; to house Mari's office and guest house in Karachi .

Beach Hut

As part of the recreational facility for the employees, Mari had established a Beach Hut at Sandspit Beach in the early 1980s. It was a double storey hut comprising of three rooms, two washrooms, a dining area attached with kitchen and a terrace lobby facing the sea. Over the years, it had gone through routine maintenance but the condition of the hut had deteriorated. Therefore, a project for the reconstruction of new beach hut was initiated in 2013 and a newly developed beach hut was inaugurated in March 2015 by Managing Director Lieutenant General Nadeem Ahmed (Retired).

Pipri Warehouse

In the outskirts of Karachi within close vicinity of Steel Town, Karachi, is located a Warehouse which was first leased in 1956 by Standard Vacuum Oil Company on yearly basis and the same was later transferred to Esso Eastern Inc. Thereafter, it went onto Fauji Foundation and finally to Mari. After pursuing the case for sixteen years, it got leased in the year 2000 for 99 years for a sum of Rupees. 3 million. It is spread over an area of five acres with a covered area of 1547 square yards, having hard standing on 1247 square yards.

Sukkur

Sukkur City is very much part of Mari's history, it is the commercial, administrative and transport hub in the area. Pakistan International Airlines now operates direct flights from Islamabad to Sukkur thrice a week. There are daily direct flights between Sukkur and Karachi. It takes almost two hours of drive to reach airport from Daharki and at times flights are subject to cancellation. Thus Mari had constructed a guest house of its own on the outskirts of Sukkur to facilitate its employees. It is a double storied bungalow tucked in between the other houses, managed by own staff.

Quetta

It was established in October 2003, after acquiring the operator ship of Bolan Block (Zarghun South). Initially office operated from Hotel Serena. Afterwards shifted to Chaman Housing in June 2005 and later shifted to Survey-31 in January 2011. The florae ploughed (about three years back) at Baleli have now flourished and fruit producing. Efforts of Brigadier(retired) Saleem Mahmood are worth highlighting as he remained regional general manager for a decade from 2009. Mr Chiragh Zameen, is performing as administrative officer since June 2012. Lieutenant Colonel(retired) Farrukh Humayun is another old hand , performing the duties of security officer since 2013.

VII

Mari: *History of History*

The idea of compiling a history of Mari was initiated in 2017 by the current managing director through the Media Cell of the company. Major Amir Bilal (retired) who is part of the media cell since 2010 formulated the team and the outline of the book. I was contacted in June 2018 and on 15th July had a meeting with Lieutenant General (retired) Ishfaq Nadeem Ahmad to get the outline of the book. His idea was to have a book which should be neither lengthy nor too short and should be in a style that an ordinary person not related to oil and gas should also find it worth reading.

I had heard about the Mari when it was a gas company and like so many others always wondered as what does this name stands for. I have never been so close or inside an oil and gas company thus like Alice in Wonderland I observed and had many questions. Luckily Lieutenant Colonel Tariq Butt (retired) who is heading the security department in Mari was my adjutant when I reported in the regiment back in 1984. Through him, I gathered answers to my queries. It was a pleasant surprise to know that himself, Major Amir Bilal and Lieutenant General Nadeem are school fellows (Saint Mary's Rawalpindi).

As the days turned into weeks, I found Mari as very efficient and precise. I met secretary of the company Mr Asad Rabbani and found him very cooperative, he is in this post for last almost decade and half. I learnt that, within these two blocks you cannot roam freely, you require access to enter into every office, you need a pre arrange appointment for any query; all hallmarks of a professional company.

The working culture of Mari is interesting; it is a blend of east and west, modernity and conservatism. On every Monday, the management wears Mari's tie and ladies adore a Mari scarf as part of the dress and on Friday everyone wears traditional dress of shalwar kameez; as a routine they adhere to closed collar dress policy. There are breaks for prayers and a dedicated place at the basement of old block acts as mosque. There are annual iftaar parties for all the staff members in the lawn of the Block No.2.

Mari , is a blend of military and civil way of working, as the managing directors are retired army generals thus they bring the rich culture of army into the company. Contrary to common perception, army life is not merely discipline in terms of punishment, rather it is vibrant, lively, open minded and liberal in every aspect. Thus in Mari, I found through the pictures, the family galas being arranged at Murree and Mangla , with tug of war competitions in which MDs are also taking part, picnics at Karachi beach hut and celebrating Women's Day in which male members are also taking part.

Dharian and Ghouri

In the last week of November 2018 , I visited Dharain and Ghouri fields, major consideration was that both rigs of Mari were in operations at both the fields. Mari's vehicle along with Hasan the photographer and self, drove to Dharian. The first pleasant surprise was to see such a well mannered and self discipline driver: he was wearing seat belt.

It is at field that one fully appreciates the HSE of Mari, the first impression of a rig area is that of professionalism and then safety. I just walked around and a commanding voice shouted us to get back. I had crossed the invisible line without wearing the safety equipment and stepped into the domain of Tool Pusher. Later myself and Hasan were both given briefing by the HSE officer, we signed a document, were issued with safety eye wear, boots and only then allowed to get closer to the rig. There are two main persons at the rig, one is known as Company Man who is as name implies is a man from company responsible for everything other than the rig. Other person is Tool Pusher, he is incharge of the rig operation. Apart from these two , there are geologist, doctor, HSE officer and few other men. Overall it is a quiet place where everyone is moving in a very specific manner. This rig is known as Rig-1, in reality it is the Rig -3, the heaviest and most powerful rigs among the three rigs which Mari owns.

Mr Butt who is the Tool Pusher highlighted the working of rig. There is no institution in our country which trains rig operators, thus one learns through on job experience; the current rig operators are mainly those who were trained and operated in Gulf. There is a fifteen member team which operates a rig, they can mantle or dismantle it within seventy two hours and transport it. Rig transportation may involve over

hundred loads and thus has to be precise and professional.

The operators all wears blue clothing whereas management staff wears khaki dress. The camp office is well laid out in two rows, there is a web connection being set up by the company itself thus real time data flow to head office. The living area is within a stone throw, there are rows of containers all air-conditioned for living, two separate dinning containers, these all are supplied and operated by a contractor who also provides laundry and other facilities. Food quality is excellent and service admirable. Rota, is the short name for rotation system. The entire crew works on Rota, meaning that they spent thirty days on site and ten days on leave, Mari provides them free tickets right uptill the their home. Rota have different scales, for abinitio and new comer it is sixty days of working and ten days leave and then it increases to forty five days' work and fifteen days off and finally it can reach fifteen days work and equal days of rest. Thus at site, I observe absolute absorption of men in their work. Rig itself never sleeps thus shifts of eight hours around the clock.

After having a sumptuous lunch and let me add that items on table including olives(black and green), sauces(mint, chilly, tomato), mustard, tobbassco, achar, were more than offered at any restaurant in Pakistan. We drove back to main G.T Road and onwards to Ghouri. There is a short cut also available but we preferred the proper route. Ghouri Field is not far from Dharian, one has to take a side road and a drive of half an hour to reach the site where Rig-2 is in operation. This site is much more established than the previous, however the layout remains the same. We were again briefed about the HSE, there was a sadqa ceremony in process, we also offered our prayers. Apart from rig which was undergoing some maintenance, there were two other major piece of equipment, the Thraedliner trucks. They are also use in drilling. Ghouri was the very first well in Punjab drilled by Mari and also the very first oil well of Mari; it was this very discovery which changed the nomenclature of the company. Close to the Rig-2, is the mausoleum of Shahb Ud Din Ghouri, an excellent architecture, serenity, beauty and peace. It was sunset, thus a look at the horizon and one goes down the historic nostalgia. The view is commanding and there is no reason or logic to disagree that it was the main route at that era . Alexander the Great must have also passed through the same territory.

Daharki

There are daily flights from Islamabad to Sukkur and from Karachi to Sukkur as well. Myself and Hasan boarded the Pakistan International Airlines , Fokker flight for Sukkur, which departs at 1530 and arrives at destination at 1745 hours. Islamabad International Airport is newly commissioned and is the very first international airport built in Pakistan since independence. At the end, when we landed at Sukkur almost half an hour in advance due to tailwinds, there was a company's double cabin alongwith driver and a Frontier Constabulary guard. It took us close to two hours of careful drive to reach Mari Field Headquarters at Daharki. Much has change on the main national highway, there is a cardiovascular hospital at Sukkur, a new university Aror is under-construction, a new cadet college at Ghotki which was inaugurated four odd years ago. All along the road there is heavy traffic coupled with the numerous two and tri wheels.

Along the highway , first comes Engro power plant, then the Qadirpur gas field, then Fauji fertilizer plant, then Engro plant and next to it is the Mari offices and colony. The sight itself is tremendous with white smoke churning out of Engro alongwith a red flame from the highest tower in Pakistan.

Mari's residential colony at night is peaceful with people walking on the well lit wide metallic road. Driver after passing through two security checkpoints dropped us in front of the guest house. The overall atmosphere in the colony is that of a well disciplined professional and educated community. The rooms itself speaks of Mari's standards, the presence of fire extinguishers in the room and in hallways alongwith first aid kits and instructions for evacuation in case of fire are all bit unusual for our culture and lifestyle.

In the morning, the view is breathtaking, tall date and palm trees, flower laden and decorated houses. First stop was hospital but before that let me add, the driver Allah Dino came wearing blue shirt and blue jeans and before he drove he puts on the seat belt and drove with extra care. The hospital of Mari is neat, clean and efficient. It is modern in every sense of word, digital entry meters, smiling receptionist and spotless floors. I was taken around the hospital, the X ray department, dental clinic, laboratory, lady doctor and so on. There were few patients, I was informed that after mid day the doctors move on to the field clinics and also on alternate days they attend far flung mobile clinics as well. Doctors instead of wearing

traditional white coat wear Khaki jacket and trouser, the standard Mari management dress. In the entire colony and offices , one witness only khaki and blue dress.

Mari Grammar School(Mari Petroleum Higher Secondary School)

Mari Grammar School is now almost a quarter of century old, without any hesitation , I can write with confidence that it is among the very best schools of the country. The vast green playground next to the school adds beauty and provides ample space for sports activities. The inter house Girls cricket tournament was in play. Principal Mr Mazhar took me for a round of the school, the newly constructed four rooms for pre-school children are worth visiting, the layout, pattern, style of teaching and the passion of teachers is worth appreciating. The art and craft room is most appealing as it is housing delicate and priceless works of children. There was an inter house debate in process. School auditorium is under renovation and soon it will be operational. The best part of this school is that it is not merely a school rather a concept. Children are allowed an extensive break for an hour at noon , during which they go back to their homes which is walking distance and consume lunch. In the evening there are supervised sports, then a prep for an hour. During prep hour, which is held in homes, no children are allowed to come out of their residence. All the teachers are having good education and teaching experience from renowned schools of Pakistan, each is provided with free accommodation and a handsome salary. Mr Farrukh is a second generation Mari, his father also served in Mari and he himself grew up at Daharki and now he is a teacher in the same school from where he started his own learning career.

Mari Gas Field- HSE at its very best

Lieutenant Colonel Khizer (retired) is the incharge of health, safety and environment(HSE at Daharki); he is from Army Aviation, he gave me a detailed briefing and later we drove out to the wells , rig and gas field alongwith another geologist Mr Jawwad who is a second generation Mari. HSE is paramount and is obvious everywhere, the bold written Muster Points, which are the rallying point in case of emergency are at prominent place, above all it is the adoption and adherence to safe life which is most obvious here, wearing of seat belts by drivers, slow driving, proper road marking are all hallmark of safe driving culture. The area

around Daharki Mari Colony is green with single metallic tracks connecting various villages, this road was also constructed by Mari, our driver Raju is also a second generation Mari, his father was in management. Raju highlighted various points of interest along the journey. The water level in the area is a matter of concern for the district administration and as such rice crop is treated in the same tone as poppy cultivation on the western frontier; it is absolutely forbidden. Our double cabin drove carefully with Raju at the wheels, we first had a brief stop at Well No.8. The chowkidar at the well is old but very vigilant and strict in enforcing all the laid down policies, Lieutenant Colonel Khizer was much impressed with his sense of duty and gave him an instant cash prize, although not much in monetary figures but very high in terms of acknowledging the man's sense of responsibility.

Being a desert frontier town , the over 900 Kilometres square area is Mari's responsibility in every sense, population of almost fifty thousand bonded with tribal bloodline dating hundred of years in antiquity are much more dependent upon Mari than on any other institution of the state. Gas Wells are like any other water well, the process of drilling a well is similar, only the cost of doing it for gas is far higher than water; these gas wells are scattered all over the area, in desert, among the houses, behind an orchard of dates or adjacent to a mosque. With few exceptions, it is the well which has acted as catalyst , as a magnet , as a hub to the population to settle around it. Mari has built roads and tracks, it is an operational necessity for the company as it has to move its heavy rigs and other associated equipment to all over the area. These tracks are compressed, raised and watered with river source almost daily when water is available in the season. Mari at its own has dug a water channel which now not only serves its purpose but also benefits the thousands of people living in the area. There are green fields astride the tracks, at some places at others simply water logged fields. In the fields one can observe women and man working together; man to operate the tractor and all other chores being left to the women like sowing and reaping of cotton crop. Women are dark skin with medium height , men are also having same colour only the built is much heavier, almost all men have beard and more than often it is dyed. Sindhi cap is an integral part of the male culture and so is the ajrak. Womenfolk have bangles and coloured glazed with mirrors chunri (cotton shawl). Talking to a shopkeeper later, I inquired about the bangles popularity among the women and he highlighted that it is a

custom in certain tribes. Among the women more specifically among the Hindu, a virgin wears bangles in both hands, so does a married , but a widow adores either one arm or remains barren on both; white colour is more traditional, in the past these bangles were made of elephant and camel bones but now glass is more common and economical. On the same issue, the shopkeeper also highlighted that use of cosmetics is quite popular among the women of all ages.

We passed through few small goths and reached Dad Laghari , a mother and child care centre is being operated by Mari. It is only after driving through the area and having witness the local population living and working , that one really appreciates the importance and value of such modern medical complex on the very edge of the civilisation. The complex is in a modern building, white washed, tiled , sanitised , organised with an air of welcome and well being; the only such structure that I have seen since morning when we left Daharki . Doctor Shabnam a gynaecologist is incharge, she travels daily with company vehicle and nurse from Daharki for her duty. She gave an introductory tour and later allowed to observe her dealing with her patients. There are high technological equipment and a well trained staff to operate. Dr Shabnam is a graduate from Combined Military Hospital Rawalpindi, she highlighted and shared her experience. ' majority of the women are pleasant to interact, they get married at early age and have quite a number of offspring, eight, nine and ten children are quite common, maximum I have seen are nineteen. Birth control or use of contraceptive is almost rare and this is where the role of lady doctor becomes important. In the area the male are supposed to get married at least twice in their life cycle and there is nothing taboo in it.' Dr Shabnam further highlighted that in many cases, there is nothing wrong with the patient but coming here and talking to a lady doctor is a social encounter and women of the area do look forward. We as a practise discourage excessive administering of sedative medicines as sooner or later it becomes addictive in nature, explained Doctor Shabnam.This philosophy of mental grooming of the patients is shared by almost all doctors; the patients culturally are accustomed to having more and more of medicines, more as a social pride than medically required. Dr Channa highlighted We tell them that excessive medicines are injurious to health, at times; patients apart from getting medicines from us also buy it from market with end result of getting sicker than before. It is only then, that they come to us and confess that, what we told them in the

beginning regarding medicines and its side effect is true. All doctors are fluent in Sindhi, Urdu and English languages, are highly qualified and have good temperament and skills. Doctors in this part of the country are performing multi role tasks; they are doctors in medical sense but also a father figure, advisor, confidants and friend in true sense. These hospitals and clinics are operated and managed through international standards; all medicines are from high end and kept in refrigerators around the clock.

Mari Deep Central Processing Facility is an amazing place in every sense, at first it gives a look of an orchard , while driving through it resembles a boulevard laden with thick green trees. This oasis in the desert is the very heart of Pakistan's fertiliser industry and in turn the very lifeline of our agriculture. Engineer Aqeel is in charge at the time, an engineer in true sense of word. He while walking, after a mandatory HSE lecture and with safety headgear, narrated how this works. This is the place where all the gas from the deep reservoir Goru-B is gathered and further distributed. At the moment, a routine check and maintenance is underway. On my appreciation of the greenery, he acknowledged and narrated ' in the beginning it was all barren without any tree, pure sun in the summer . We worked and also planted trees with the same zeal and enthusiasm as we have in drilling. Now the average temperature has dropped drastically in the complex and it is good for the equipment.

Local Marriage

I also attended a local wedding ceremony, kind of Mr Ayub the resident manager that he took me along in his own official vehicle; all in all there was a convoy of half a dozen Mari vehicles and everyone was attending, there was an escort of constabulary as well.

Mr Ayub a graduate of Lahore University of Engineering highlighted that the relationship between the Mari and locals runs much deeper than what is commonly expected from a company and surrounding population. Driver drove through the darkness, Mr Ayub highlighted that in last twenty odd years there has been only one incident of any item being stolen from the Mari's wells in the area and all this is attributed to this cordial self-respecting equation between a billion US $ company and a poor local. Mari is not merely a company in ordinary sense, it is seen as a kind of patron and saint among the local, the schools, dispensaries

all add to this faith. Mr Ayub highlighted the steps taken to enhance the environment in the area, most common and most useful and long-lasting is plantation , excessive plantation keeping in view the mortality rate. I complimented him on the good interior of the Land Cruiser and he rather humbly admitted that, at times feel at lost because this vehicle requires a servicing after every journey in the desert thus he uses it sparingly and this event falls in such category. On my query as what was the most difficult task he has undertaken so far, Mr Ayub without any hesitation recalled the drilling operation they undertook in 2016 in the deep desert. It was difficult because of rig movement, the sand dunes were too soft to bear the weight of transportation thus we had to strengthen the track , and that made it something special , in the end, the drilling itself was not worth commercially viable; however the experience is something which not only I cherish but all of the Daharki staff feel proud of their achievement.

The Resident of Mari holds a special place among these villagers and tribesmen, in this part of world as anywhere else pomp and show is a prerequisite for being taken seriously. We finally reached the destination, a well lit place seen some distance otherwise there were so many turns involved in this hour long journey that an ordinary person is bound to lose the way. The wedding ceremony is the son of a poor peasant who over decades of working as chowkidar and as contractor has been able to build his own ‘goth’ and now this being the very first such event in his family , he invited all the management of Mari and this was very kindly accepted by the Resident . It was all sand when we stepped down and from this point onward Mr Ayub was received by the father of the groom and I joined other colleagues. As we entered the marquee, well-lit with generators, all the people present rose and greeted us. The host had put up his best to make this event a memorable, there were singers including a lady . Purely as a social scientist, it provides a classic stage to observe the behaviour of the locals, all male, in the presence of a female singer. She was courteous, beautiful and sang well in Sindhi, she had an entire orchestra comprising of tabla players and harmonium. Occasionally the men would get up, whirl around a five hundred rupee note over the head of the groom and then threw it in air and a young lad from the singer’s entourage would catch it before it lands on the carpet. Overall it was very graceful and enjoyable event, sealed water bottles was the only drink available and no smoking inside the marquee. Food was served in the adjacent portion, there were few chairs for the guests

and there were no spoon or anything of this sort, pure local food. We bid goodbye soon after the dinner, on return journey, I sat with Major retired Taj, and Lieutenant Colonel retired Khizar; Major Taj was on the steering and soon we lost our way but managed to find our way back without any panic; it just highlights how easy it is to get lost in the desert.

Draft of the book was presented to the MD in October 2018 and he generally approved it with few changes and it was again put up in February 2019. The two major events took place in between, first was the visit of Chief of Army Staff General Qamar Bajwa to the Mari Headoffice in January 2019. This was the first ever visit by any COAS to the Mari, thus it is a historical event. General Qamar Bajwa appreciated the performance of the Mari Petroleum Company, he also interacted with the Mari's hockey team and gave them few good tips. The other important event was the Mari's annual function which was held at Serena Hotel and Minister of Petroleum Mr Chaudhry Ghulam Sarwar Khan was the chief guest. It came as a very good pleasant surprise to see the minister being so well informed about the ministry and petroleum issues; really impressive. A good dignified, lively, well-orchestrated affair attended by a majority of the management with their families. There were few ambassadors and high commissioners also present as the guest.

Mari celebrates National Days with zeal and pride, Iqbal's Day, Birthday of Quaid-e-Azam, Pakistan Day, Independence Day, Defence Day all are celebrated with an aim to keep the spirit, pride, dignity alive and to pass it on to the next generation. Independence Day on 14th August 2019 was special as Mari showed its solidarity with the people of Kashmir, who were under the brutal clampdown from Indian Government after it had removed their special constitutional status

After having spent a year at Mari, I became part of it, faces becomes familiar. The culture and working environment are professional; it starts at 0800 hours and precisely at 1600 hours the pack up starts. There are air conditioned buses and vans for the employees and this by itself is a great relief in a city where driving is more stressful than the actual work. In the time, Hassan the photographer was posted to Halini, Lieutenant Colonel (retired) Tariq Butt had availed the yearly recreation ex-Pakistan leave with his wife to Turkey. Mari as a policy offers a yearly return ticket for two to Turkey. Media Cell also shifted from old

block to a new building across the road. In the winter of 2018-19, Tulips were planted for the first time at Mari and coming weeks were spent in eagerness and finally much to the relief of gardeners they blossomed; almost everyone had a selfie with them .

The daily lunch at Mari is a special event, without any exaggeration of words, it is simply the best food experience in the twin cities, the ambience, hospitality and above all the quality of food is excellent. The security guards at Mari are all ex-servicemen and as such daily interaction with them reminds of the regimental life. The trio of Miss Adeela, Mr Tahir and Mr Ghawash all from Business Department of Mari were instrumental in reading the draft and highlighting mistakes and offering valuable suggestions. Book is in debt to them. The proof reading is a convoluted affair more so when it is done through computer, few mistakes are removed and in the bargain few more are inserted and it seems an unending affair.

Regarding pictures used in this book, majority of them are from the Mari's own archive, Mr Azhar Hafeez, Mr Nadeem Ghouri, Mr Hassan of Media Cell and Major (retired) Tahir Kayani have contributed, especially the latter's aerial pictures of Balochistan.

No amount of words can encompass the support given by the Media Cell of the Mari. Major (retired) Amir Bilal is a source of inspiration in every sense; he is soft, very cordial yet very firm in his dealing. He is involved in this project from the inception and showed great patience. At the end of this project, in July 2019, he underwent a personal tragedy when his wife departed for eternal abode. Funeral was a family affair in which not only the Mari's present and retired employees at Islamabad but management from Daharki who had travelled by road were present to offer their sympathies and to shoulder the sorrow. To me it highlights the very spirit of Mari; it is not merely a commercial company it runs as a family.

In the end this book would not have been possible without the patronage of Lieutenant General (retired) Ishfaq Nadeem Ahmed Hilal-e-Imtiaz (Military) the present Chief Executive and Managing Director of Mari Petroleum Company Limited. He was appointed as MD on 26th January 2017. He was commissioned in January 1980 in an Azad Kashmir Regiment, he is a graduate from Staff College Camberly

(U.K) and National Defence University, Washington (USA), commanded a strike corps and also remained as Chief of General Staff of Pakistan Army. Lieutenant General (retired) Ishfaq Nadeem also remained as the Colonel Commandant of Azad Kashmir Regiment.

Author. Major Retired Aamir Mushtaq Cheema was commissioned in September 1984 from Pakistan military academy in an Anti Aircraft Regiment (58 MAA). He later earned his flying brevet and served in fixed and rotary wing squadrons apart from faculty of Army Aviation School. After retirement in 2008, he pursued an educational career, gaining a Master of Letters Degree in History from University of Glasgow. Presently he is Ph.D Scholar at national defence University Islamabad. He has authored *Royal Air Observation Corps 1935-1956. An Illustrated History of North Waziristan Militia 1895-2012. An Illustrated History of Chitral Scouts 1903-2014. An Illustrated History of Khyber Rifles 1878-2015. An Illustrated History of Pakistan Rangers 1957-2016. An Illustrated History of Cobras 1985-2019.* He co-authored *An Illustrated History of Pakistan Army Aviation 1947-2007.*

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